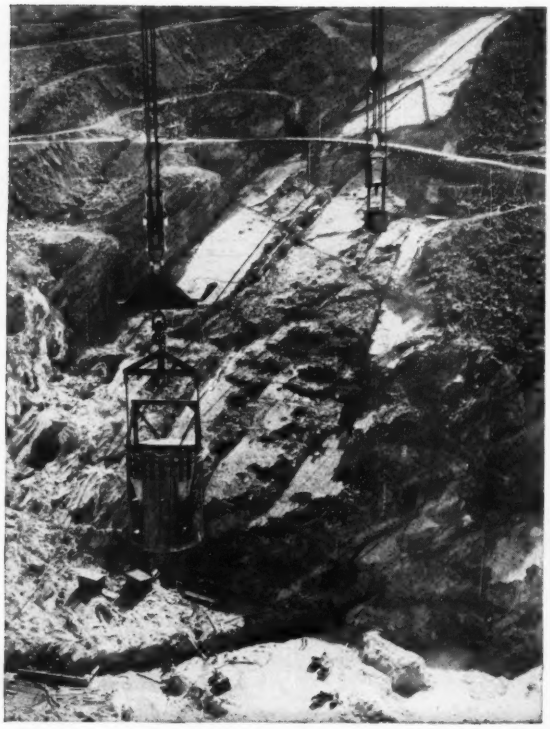
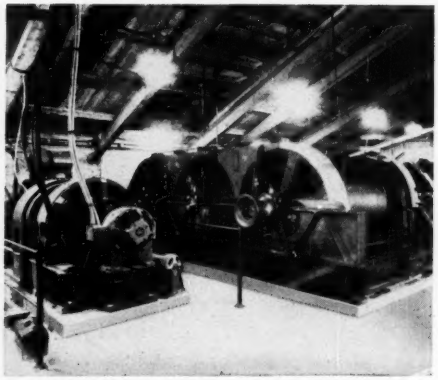
CONSTRUCTION METHODS AND EQUIPMENT

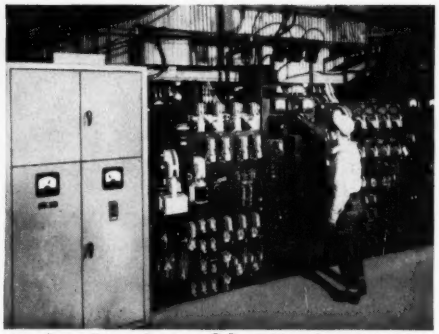
January 1951





▲ Aerial cableway hoist room showing hoist drums and one of three General Electric motor-generator sets used to drive the powerful G-E 500-hp hoist motors.

◀ Concrete in 8-cubic-yard buckets is moved nearly half a mile on a G-E powered aerial cableway for placing concrete in the construction of Hungry Horse Dam.



Attendant adjusts voltage on G-E switchboard panel. At left is G-E Cabinetrol. Installation provides variable voltage for smooth, accurate speed control of cableway hoists.

BIG LIFT carries concrete across a canyon ... *Electrically*

G-E Powered Aerial Cableways Vital Link in Concrete Placing at Hungry Horse Dam

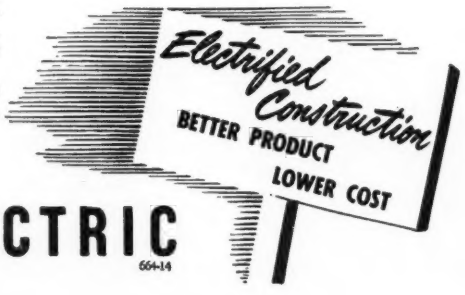
Carrying 2,900,000 cubic yards of concrete across a half-mile canyon! It's only one of the big jobs at which the General Shea Morrison Construction Company works night-and-day to complete Hungry Horse Dam on schedule for the Bureau of Reclamation. But they're licking this and the many other problems that face them on the Flathead River site in northwestern Montana. Their answer lies in the use of co-ordinated electric equipment—G-E substations, motors, motor-generators, Cabinetrol*, and switchgear, carefully integrated into one complete system.

Construction equipment electrified by General Electric can provide *you* with new on-the-job flexibility, speed, and safety. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

**Reg. trade-mark of General Electric Co.*

Ask him Today!

Whether you buy or build construction equipment, your G-E representative can show you how to do a better job—at lower cost—by complete electrification. Write him now, and he'll call on you at your convenience.



GENERAL ELECTRIC

664-14

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Cord belt for tough jobs, longer centers, higher lifts

Gives 2 to 6 times greater impact resistance

WHERE you have heavy impact, long centers, high lifts, there's a special belt for your installation — the B. F. Goodrich cord conveyor belt:

Cord belt stands more impact — Each lengthwise cord in a B. F. Goodrich cord belt is completely surrounded by rubber — no cross threads tie them together. Cords are free to "give" when impact occurs. Rubber distorts temporarily, distributing and absorbing a shock that would damage stiff, unyielding plies. As an extra protection, B. F. Goodrich has added a patented *Transcord Breaker* — an extra layer of parallel cords in rubber, placed across belt width. Acts as a shock absorber, stretches to prevent gouges and cuts from splitting belt cover.

Cord belt troughs better — There being no crossweave in the cord plies, cords are free to flex. Belt conforms to idlers, pulleys. Spillage is reduced, troughing is natural and belt keeps centered on idlers, sustains less damage, requires less maintenance. Longer centers, higher lifts can be used.

Cord belt at work — Inside the housing shown here, a 3,000 ft. B. F. Goodrich beltroad handles iron ore in one of the largest mines on the Minnesota Iron Range. Installed in 1946, this belt has handled over 10 million tons. Estimated life is 10 more years, 30 million more tons.

The first B. F. Goodrich cord belt ever made is still on the job after 12 years and 14 million tons of rough-riding coal. If rock, coal, sand, gravel, ore or any other material rough-rides your conveyor, you can save money by calling in your local BFG distributor. *The B. F. Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

Conveyor Belts BY
B.F.Goodrich

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The Latrobe Construction Company, which owns and operates four Gradalls, has discovered that the Gradall does things one machine never did before . . . that it can do precision work out of the reach of ordinary construction machines . . . that it eliminates much hand labor.

But you'll want to see for yourself. If, by chance, you don't know where you can quickly see a Gradall in operation, call your nearest Gradall Distributor. He'll be glad to give you a demonstration . . . to show you how Gradall's versatility, precision, and speed can improve your profit picture.

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Save time!
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MACWHYTE SLINGS:

Available in all types, sizes and lengths, to meet almost any lifting requirement. Macwhyte ATLAS Round-Braided Slings, Drew Flat-Braided Slings and Monarch Single-Part Wire Rope Slings are all made to order to fit your needs. Illustrated is a special Macwhyte Drew 14-part Type 1CT Flat-Braided Sling.

WHATEVER YOUR NEEDS

for wire rope, slings, special assemblies, solutions for special problems, ask a Macwhyte distributor or write direct to Macwhyte Company for suggestions and recommendations.

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Volume 33
Number 1

CONSTRUCTION METHODS AND EQUIPMENT

ESTABLISHED 1919

ABC Member ABP

JANUARY 1951

Pay Dirt in This Issue

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Pinned securely with pipe piles in tower legs, four of them guide heavy caissons for York River Bridge.

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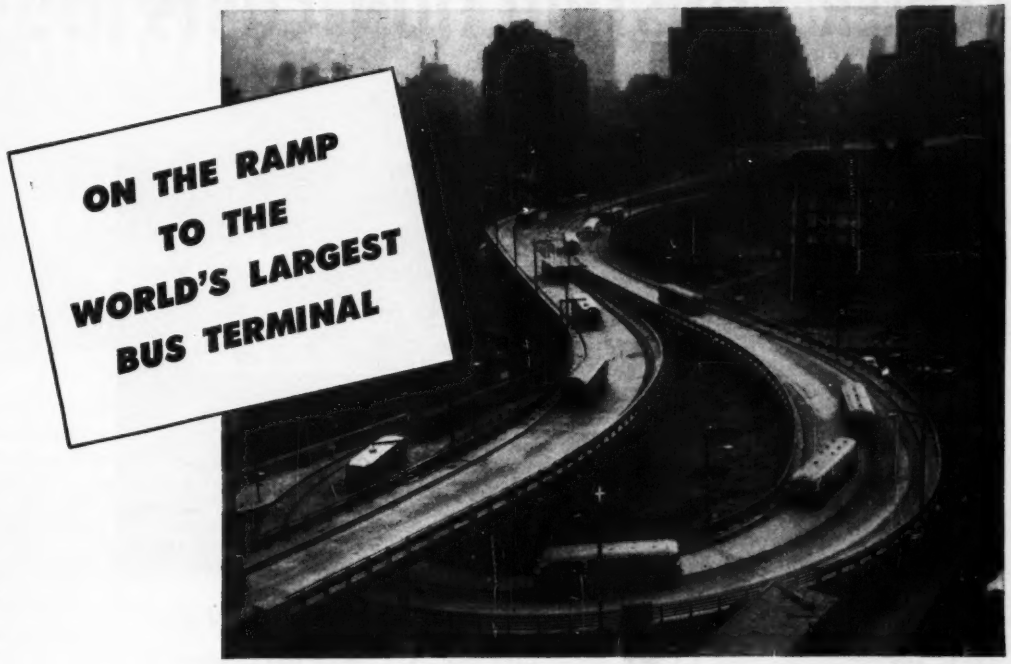
It's Always Fair Weather—



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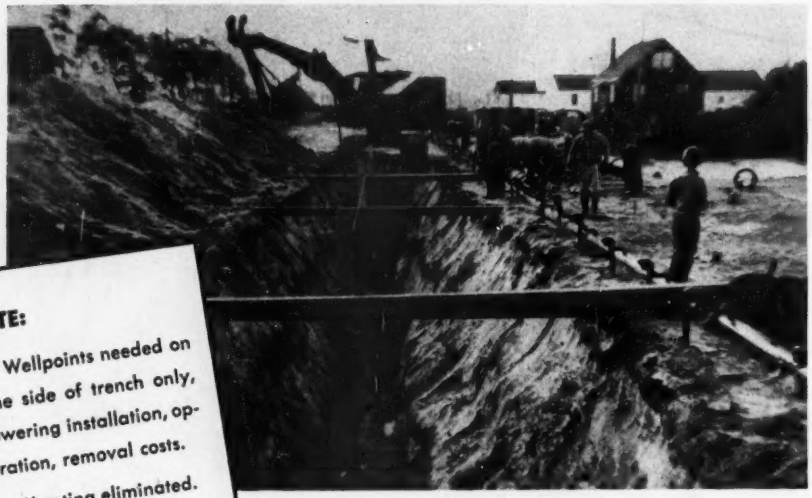

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1. Wellpoints needed on one side of trench only, lowering installation, operation, removal costs.
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Frank Nero and Son has 50,000 feet of sewer to lay in Lavallette, N. J. Nine feet of water in sand layered with clay and peat bog form a handicap.

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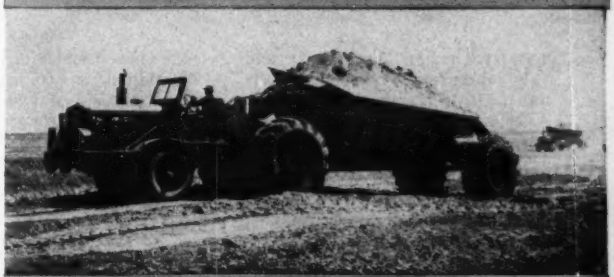
Rear-Dump "Eucs" have capacities ranging from 10 to 34 tons with diesel engines of 125 to 380 h.p. This 15-ton model, with top extensions, is being loaded on a highway construction job in Massachusetts.

Euclid Scraper picks up a heaped load on an airport job in North Carolina. Capacity is 15.5 cu. yds. struck . . . 275 h.p. diesel engine.



Bottom-Dump Euclids range in capacity from 13 to 26 cu. yds., have diesel engines of 190 to 300 h.p. This "Euc" is hauling approximately 30 cu. yds. at a big earth fill dam in Colorado.

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The Wallowa County Road Department office in Enterprise, Oregon, operators of the equipment shown above, have this to report: "The B. F. Goodrich tires have given longer and better all-around service than any other brand we have used." In other words, the tire that's hard to cut is the tire that cuts costs.

Whatever job your off-the-road equipment must perform, there's a special BFG tread built to help you do it better. In addition, you get the exclusive protection of the nylon shock shield at no extra cost.

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RESEARCH KEEPS
B.F.Goodrich
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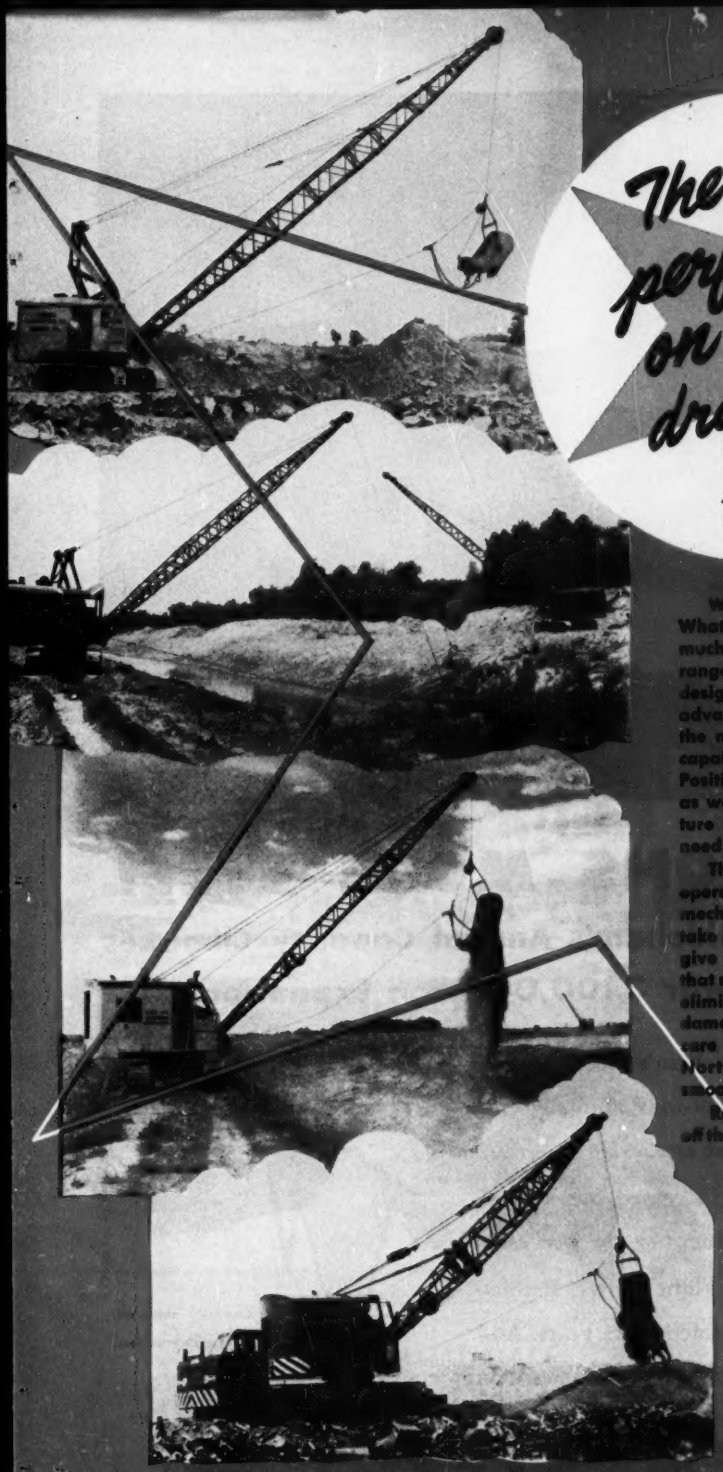

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What size Dragline job? How much travel? What size ditch—how much overburden—how much reach—how much output? The Northwest range of Dragline Capacities and features of design give you the greatest combination of advantages of any equipment of this type on the market. You'll find the Northwest Crawler capable of more miles of travel—without trouble. Positive traction on both crawlers while [illegible] as well as when going straight ahead—a feature of the larger Northwests—minimizes the need for mats with big machines.

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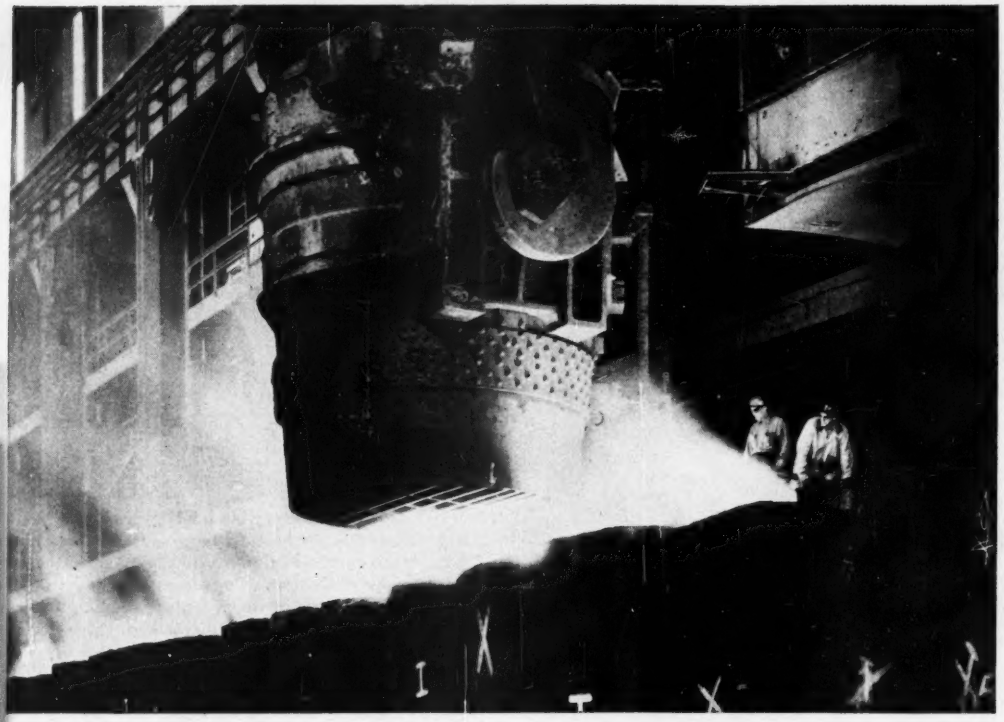

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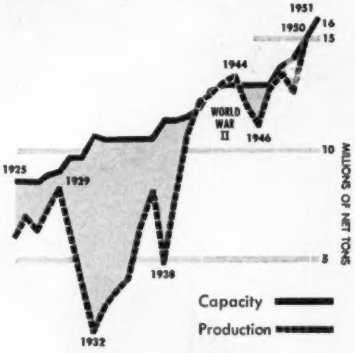
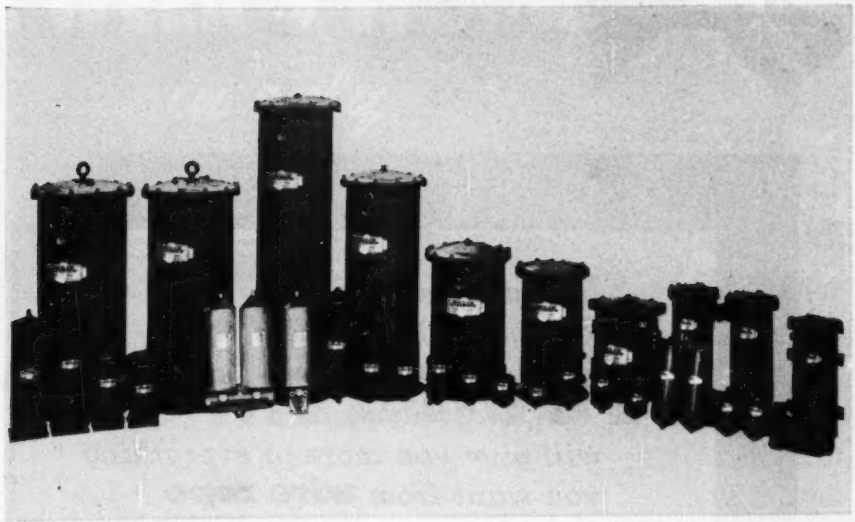
Moreover, as the chart at the right shows, Bethlehem's steel capacity has nearly doubled in 25 years. Additional capacity can and will be created as it is needed.



BETHLEHEM STEEL ★ BETHLEHEM STEEL ★



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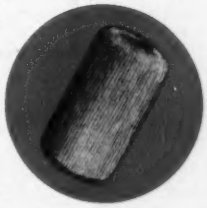

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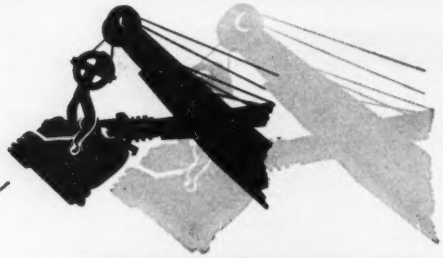

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will give you more of everything you want from wire rope

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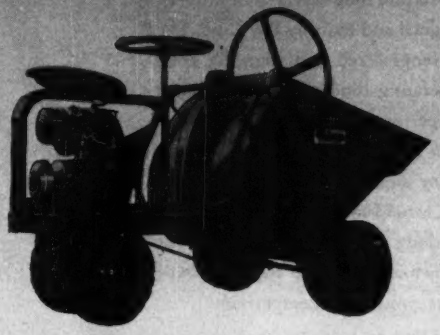
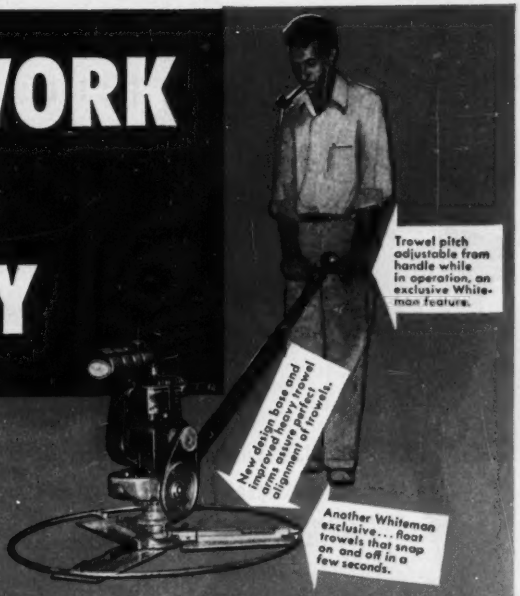


WHITEMAN POWER BUGGY

Carries as much concrete as six men with wheelbarrows and speeds it up to 16mph, up 25% grades, to upper floors, over light scaffolds, through doorways. New mechanism gives positive control of the dump. 7.5hp, 4 cycle air-cooled engine. Proved versatile, tough, dependable over many years.

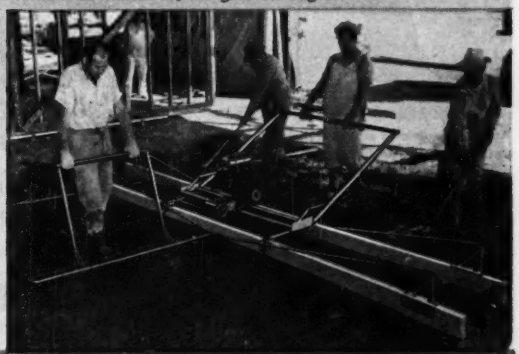

Trowel pitch adjustable from handle while in operation, an exclusive Whiteman feature.
New design base and improved heavy trowel arms assure perfect alignment of trowels.
Another Whiteman exclusive . . . float trowels that snap on and off in a few seconds.

WHITEMAN FLOATING-FINISHING MACHINE

The choice of experienced cement finishers. Float trowels can be easily *snapped on in a few seconds* to compact the slab, drive out air pockets, bring up moisture and produce an excellent traction surface. For finishing, remove the "float" trowels and use the tool steel finish trowels. Pitch of trowels can be adjusted by control knob on handle while in operation — an *exclusive patented* Whiteman feature that is a terrific time saver. Electric or gasoline powered. *New design base and improved heavy* trowel arms *assure perfect alignment of trowels.*

WHITEMAN RODDING MACHINE

Eliminates labor of hand rodding (or screeding) and increases efficiency. Rods the slab to a perfect level and at the same time puddles and vibrates the concrete throughout the entire depth and area. Thoroughly compacts slab and brings moisture to surface for finishing operation. Rods up to 15 foot widths. 1½ HP gasoline engine.



Whiteman MANUFACTURING CO.
3249 Casitas Ave.
Los Angeles 39, Calif.

Send information on [ ] Power Buggy, [ ] Floating—Finishing Machine, [ ] Rodding Machine. Dept. C-5

Name ..... Firm .....

Address .....

City ..... Zone ..... State .....

It's not just a rugged truck—
It's not just a powerful crane—
It's both in one!
It's a BAY CITY built **CRANEMOBILE**

This is the famous
25 ton capacity
CRANEMOBILE
that is getting
big jobs done in a hurry!

Merritt, Chapman & Scott Corp., New York contractors, use their CraneMobile on the Annapolis side of the new Delaware Memorial Bridge at Sandy Point, Md. Like Merritt, Chapman & Scott, repeat BAY CITY buyers, contractors throughout the country like CraneMobile's *big* performance on *big* jobs.

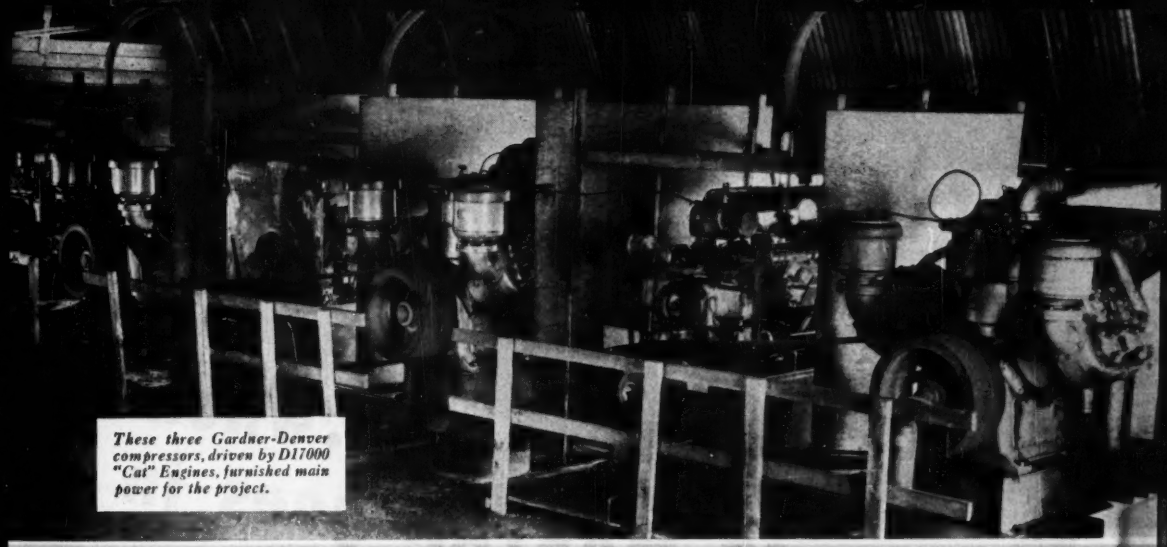
When you buy a CraneMobile you get a compact, complete unit for the most efficient handling of heavy loads, high lifts and long reaches. Both crane and carrier are designed and built by Bay City. The carrier is specially engineered and ruggedly built to meet difficult operating conditions. The crane is designed for high performance and easy operation in every detail from the pin-connected boom to the full length cast alloy steel base. With capacity to 25 tons, the *big* CraneMobile handles *big* jobs, unusual loads, and long reaches with ease. See for yourself why contractors prefer the Bay City built CraneMobile. Make your own comparison.

For latest catalog see your nearest dealer or write BAY CITY SHOVELS, INC., BAY CITY, MICHIGAN.

180

BAY CITY

SHOVELS • CRANES • HOES • DRAGLINES • CLAMSHELLS

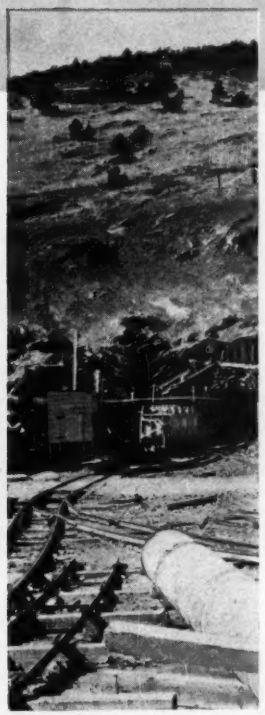


These three Gardner-Denver compressors, driven by D17000 "Cat" Engines, furnished main power for the project.

Drill Power

on the Big Thompson

Stand-by power was supplied by two portable compressors, driven by D13000 Engines.



The mouth of the Big Thompson tunnel, entering rocky hillside near Loveland, Colo.

A VITAL link in the Big Thompson water diversion project is a mile-long, 8-foot tunnel west of Loveland, Colorado.

Tarlton Construction Co., of Loveland, drove this tunnel through hard rock, and all power for drilling was supplied by "Caterpillar" Diesel Engines. Three D17000s, driving stationary Gardner-Denver compressors, were the main power source. And two portable compressors, powered by D13000 Engines, were used to round out this air compressor team.

Over the years, "Caterpillar" Diesels have built a solid reputation for durable construction, simplicity, economy, long, dependable work life and excellent dealer service. That's why they are standard power in leading makes of compressors, crushers, excavating machinery and other types of heavy-duty equipment.

Today the importance of "Caterpillar" products, both for military use and for maintaining the national economy, is greatly increased. Talk over your machinery requirements with your "Caterpillar" dealer. He has ample parts stocks to keep your present equipment doing its job and will do his utmost to make prompt delivery of new machines.

CATERPILLAR, PEORIA, ILLINOIS

CATERPILLAR

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DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

MAINTENANCE COSTS GO DOWN

...when TEXACO MARFAK goes in

TUNE IN . . . TEXACO presents MILTON BERLE on television every Tuesday night. METROPOLITAN OPERA radio broadcasts every Saturday afternoon.

TEXACO

TEXACO

Texaco Marfak stays in bearings in spite of the roughest service your bulldozers, shovels, trucks and other equipment may get. *Texaco Marfak* is both adhesive and cohesive, won't pound or squeeze out, resists washout. You get longer lasting protection against wear and rust . . . positive assurance of longer parts life, lower maintenance costs.

In wheel bearings, *Texaco Marfak Heavy Duty* gives similar long-lasting protection against wear and rust . . . requires no seasonal change. It seals out dirt and moisture and seals itself in — assuring longer bearing life, as well as safer braking.

For further savings, lubricate engines — heavy-duty gasoline or Diesel—with *Texaco Ursa Oil X***. This fully detergent-dispersive oil cleans as it lubricates . . . keeps rings free, assuring better compression and combustion . . . keeps fuel consumption and maintenance costs down.

Let a Texaco Lubrication Engineer work with you to simplify your lubrication procedures and reduce your costs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

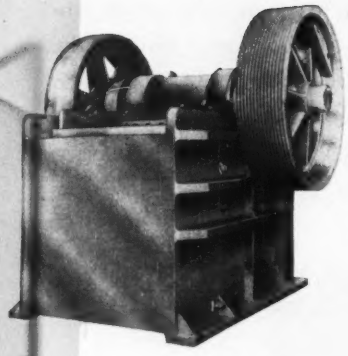
MORE THAN 350 MILLION POUNDS OF **MARFAK** HAVE BEEN SOLD!

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

GREATER PRODUCTION CAPACITY for INCREASED PLANT EFFICIENCY LOWER OPERATING COSTS INSTALL

for crushing

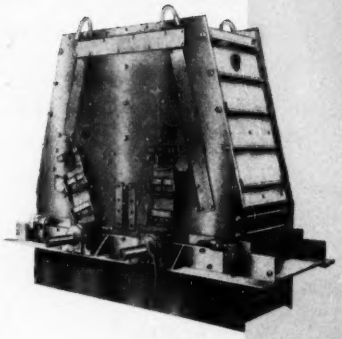


JAW CRUSHERS

HERE'S the high capacity primary crusher that sets the production pace for your entire plant! Cedarapids quality-built Jaw Crushers are the overhead eccentric type with one stationary jaw and one movable jaw and are engineered for *extra capacity* with smooth, steady performance plus low operating and maintenance costs. There's a size for every need from 6′ x 12′ to 32′ x 40′.

DOUBLE IMPELLER IMPACT BREAKERS

THIS is the unit that assures greater hourly tonnage capacities of the cubical shaped aggregate required in so many specifications today. Used for both primary and secondary reduction in many applications, its extremely high ratio of reduction eliminates much accessory equipment such as secondary crushers, screens, conveyors, etc. Less horsepower required because a high percent of material is broken in suspension. 50% less contact of stone on metal reduces wear on working parts. Four sizes available.



Use Cedarapids Crushers in your plant to be sure of meeting production schedules

TWIN JAW CRUSHERS

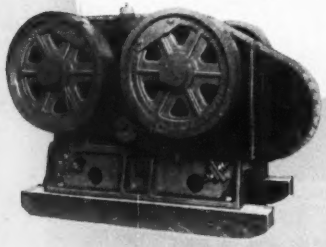
YOU get approximately twice as much capacity with a Cedarapids Twin Jaw Crusher as with a single-jaw crusher of the same size. This increased capacity is ideal for maintaining high production in pits with 50% or 60% of oversize material to be crushed. Rubbing between jaw plates is eliminated because both jaws move in-and-down as well as out-and-away in synchronized motion. A complete range of sizes.

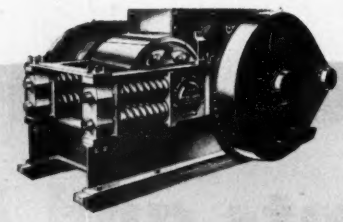
ROLL CRUSHERS

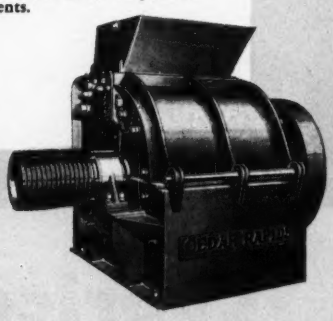
For secondary crushing, Cedarapids Roll Crushers assure high production of the required smaller size aggregates. Manganese steel roll shells, either smooth or corrugated, and large, heavy flywheels, plus other heavy-duty construction features provide maximum long life and economical operation. Cedarapids exclusive patented safety shear plates prevent crusher damage from foreign material. Sizes range from 16" x 16" to 40" x 24".

HAMMERMILLS

Cedarapids Hammermills feature a revolutionary principle of crushing to give more tons per hour of finer quality finished products than similar types of equipment of comparable size. They produce either crushed limestone up to 1½", or agricultural lime, or a percentage of both, depending on the setting of the grates and speed of the rotor. Three sizes . . . 2033, 3033, and 4033, will meet all your requirements.







THE IOWA LINE *of Material Handling Equipment Includes:*

ROCK AND GRAVEL CRUSHERS • BELT CONVEYORS • STEEL BINS • BUCKET ELEVATORS • VIBRATOR AND REVOLVING SCREENS • UNITIZED ROCK AND GRAVEL PLANTS • FEEDERS • TRAPS • PORTABLE POWER CONVEYORS • PORTABLE STONE AND GRAVEL PLANTS • REDUCTION CRUSHERS • BATCH TYPE AND VOLUMETRIC TYPE ASPHALT PLANTS • HAMMERMILLS • DRAG SCRAPER TANKS • WASHING PLANTS • SOIL COMPACTION UNITS • STEEL TRUCKS AND TRAILERS • KUBIT IMPACT BREAKERS • DOUBLE IMPELLER IMPACT BREAKERS

CEDARAPIDS

AGGREGATE PRODUCING UNITS Now!

for material handling

CONVEYORS

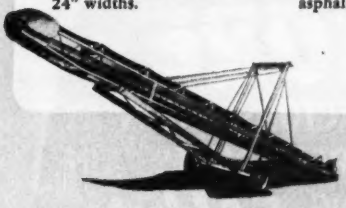
Cedarapids portable belt conveyors with their own power unit are the flexible and economical answer to aggregate handling problems. Either the channel frame or lattice frame type can be supplied in 30', 40' or 50' lengths and 18" or 24" widths.

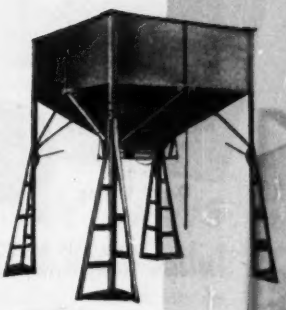
FEEDERS

Apron type or reciprocating feeders provide a smooth, workable flow of material to crushers, conveyors and bucket elevators, preventing overloads and surges. Available in a wide variety of sizes for all types of aggregate or asphalt plants.

BINS

All-steel storage and loading bins give sturdy, dependable storage facilities for all types of prepared material. Jack leg and knockdown types are available with or without partitions. Special sizes and types can be built to order.

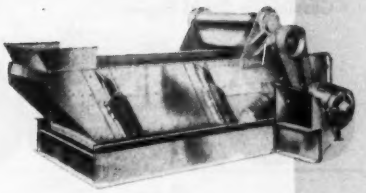




for screening

HORIZONTAL VIBRATING SCREENS

Here is the most efficient screen available today! Its better screening action, highly accurate gradation and large capacity combine to give you faster and more profitable screening at lower cost. Sizes range from 36" x 8' to 48" x 14' in single, double or triple deck styles. In addition, the Cedarapids line contains screens for special uses in a wide variety of sizes, including ag-lime screens, inclined vibrator screens and revolving screens.



for complete plants

From the Single Pass Plant or Pitmaster for the smaller jobs...to the Junior or Master Tandem...or the complete 4-unit Unitized Plant for the largest operations, there's a Cedarapids complete portable aggregate plant in a size and type to fit your pocketbook as well as your production needs.

Your Cedarapids distributor will gladly give you production facts and figures on all Cedarapids equipment, including the complete line of portable bituminous mixing plants. Call on him today.

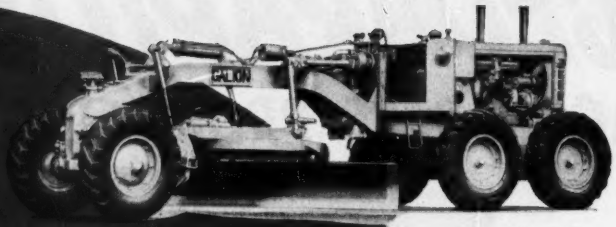
IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U. S. A.

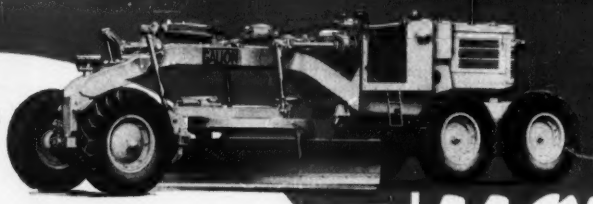
Cedarapids

Built by IOWA

MORE and MORE-



No. 118
MOTOR GRADER
Extra Heavy-Duty
100 h.p.
Diesel Engine

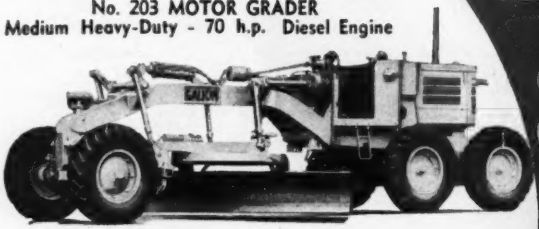


No. 104
MOTOR GRADER
Heavy-Duty
- 76 h.p.
Diesel Engine

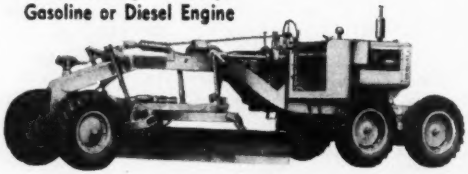
and MORE-

CONTRACTORS, HIGHWAY and STREET DEPTS. ARE USING GALION GRADERS

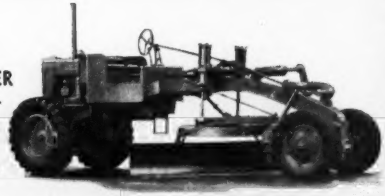
No. 203 MOTOR GRADER
Medium Heavy-Duty - 70 h.p. Diesel Engine



No. 303 MOTOR GRADER
Medium-Duty - 50 h.p.
Gasoline or Diesel Engine



No. 402
MOTOR GRADER
Light-Duty -
31 h.p.
Gasoline
Engine



Superior Value and Performance Count --- with experienced construction men. That's why their preference for GALION Graders is becoming more pronounced every day. A size for every need and use. Write for information on the size in which you are interested.

GALION

ESTABLISHED 1907 **MOTOR GRADERS • ROLLERS**

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Cable address: GALIONIRON, Galion, Ohio

LOOK! JOE . . . I made this cut with my Clipper in 5 seconds!

SOLD DIRECT *from Factory to User*

Yes...

CLIPPER MASONRY SAWS

Make *Any* Cut Quickly and Easily!

Yes, you can slice through the hardest materials in seconds with the New Clipper Masonry Saws. Smoother, faster cutting action than ever before. You'll find Clipper's the Genuine answer to any masonry cutting problem. Contractors agree on the New wet or dry cutting Model HD for the 100% Answer to ALL masonry problems. Actually the HD is Two Saws In One—it will meet your DUSTLESS cutting requirements in confined areas and will cut dry for outside operations. Every Clipper Masonry Saw is GUARANTEED, "To provide the Fastest Cut . . . at the Lowest Cost . . . with the Greatest Ease . . . Any Time . . . Any Where!"

PACKED WITH EXCLUSIVE FEATURES

DUSTLESS CUTTING WITH MODEL HD

PRESSURE EQUALIZER
Makes your blades last longer . . . because Equalizer Spring automatically cushions blade pressure whether cutting HARD or SOFT materials. Guarantees faster cutting—longest blade life. Outstanding for blade economy.

SELECT-A-NOTCH
One man easily adjusts Cutting Head to desired height . . . whether cutting Stone, Concrete Block, Glazed Tile or Quarry Tile. Operator's hands merely guide — All weight supported by rear Connecting Bar.

ADJUST-A-CUT
Merely pull the knob — and the Cutting Head is free for finger-tip setting at any desired angle. Release the Knob—and head is locked in desired position. Another Clipper Patented Feature.

SAVE-A-BLADE DIAL
Just turn the Save-A-Blade Dial to the hardness of the material you are cutting and the Clipper Pressure Equalizer Spring automatically sets the tension, to guarantee faster cutting and longer blade life — whether the material is HARD or SOFT . . . Whether using Diamond or Abrasive Blades . . . Cutting Wet or Dry with the Dustless Model HD. (Not on Model C Series.)

WET-OR-DRY PUMP
No need to remove bolt when cutting dry. No maintenance . . . Factory Sealed . . . An exclusive Clipper development. Patented Water Application Unit systematically controls water flow.

Only Clipper Has NINE Models To Choose from! . . .

Not ONE Model—Not TWO Models . . .
But NINE separate and distinct Clipper Saws for you to choose from. Each completely different in price, in size, in performance. Select the Clipper Model that EXACTLY SUITS YOUR particular needs!

DRY ABRASIVE BLADES
WET ABRASIVE BLADES
DIAMOND BLADES

Cut DRY—or cut WET . . .
Cut with ABRASIVE Blades—or with DIAMOND Blades . . .
In the more than 50 standard and special CLIPPER Blade specifications you will find THE EXACT SUPERIOR BLADE to cut YOUR materials AT THE EXACT SPEED YOU require!

Clipper
NATION-WIDE DIRECT FACTORY SERVICE

MANUFACTURING COMPANY
KANSAS CITY 8, MO.

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2809 N.W. WARWICK · KANSAS CITY 8, MO.

Send TODAY information on the FREE TRIAL offer and literature and prices on the 1950 Clipper Masonry Saws.

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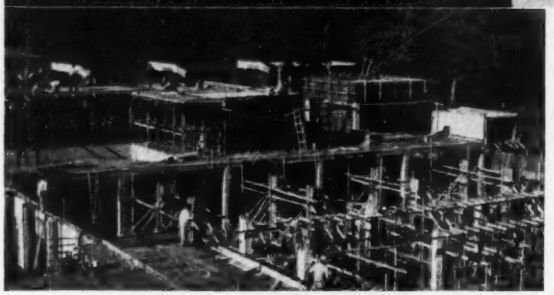


TUBERCULOSIS HOSPITAL, Rio Piedras, Puerto Rico
ARCHITECT: Isador Rosenfield
CONTRACTORS: Mendez, Grillasca, Nolla, Galib and Marquez, Inc.

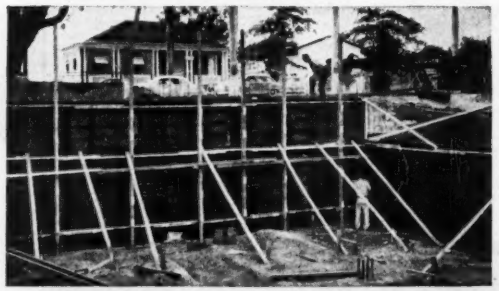
UNI-FORMS built this 800 bed hospital in record time . . . formed walls, slabs, beams, columns, tunnels, retaining walls . . . and saved $36,748.60 in forming material costs alone!

UNI-FORMS reached the job ready to use . . . provided faster, smoother forming cycles . . . labor costs were ½ the estimate . . . possible only with UNI-FORMS!

You can use UNI-FORMS . . . to form *any* type of concrete . . . to save time, labor and material . . . to assure more profit on every yard of concrete you pour.

BILL OF MATERIAL FOR FORMING CONCRETE ON TUBERCULOSIS HOSPITAL, RIO PIEDRAS, PUERTO RICO

***ESTIMATED:**	
1,000,000 Bd. ft. of lumber required for forms, walers, alignment, etc., @ $ .10 per Bd. ft.	$100,000.00
LESS 20% lumber salvage	20,000.00
TOTAL ESTIMATED COST	$ 80,000.00
†UNI-FORM COSTS:	
22,500 sq. ft. of UNI-FORMS	$ 37,256.80
400,000 bd. ft. alignment and bracing lumber actually used	40,000.00
SHIPPING UNI-FORMS TO JOB	3,800.00
	$ 81,056.80
Less Contractor's valuation of UNI-FORMS at end of job. 80%	$ 29,805.40
LESS 20% LUMBER SALVAGE	8,000.00
TOTAL ACTUAL MATERIAL COST	$ 43,251.40



UNIVERSAL
Form Clamp Company
Founded 1912
1238 N. KOSTNER • CHICAGO 51, ILL.

IN ~~1950~~ 1951

FOR THE ~~13th~~ 14th CONSECUTIVE YEAR

No other graders will perform so many construction and maintenance jobs so well as the 88-H...99-H...and MASTER 99

The Power Graders that Have Everything

★ All-Wheel Drive ★ Precision Sideshift ★ High-Lift Blade ★ Completely Reversible Blade
★ All-Wheel Steer ★ Controlled Traction ★ Extreme Blade Reach ★ Full Hydraulic Control

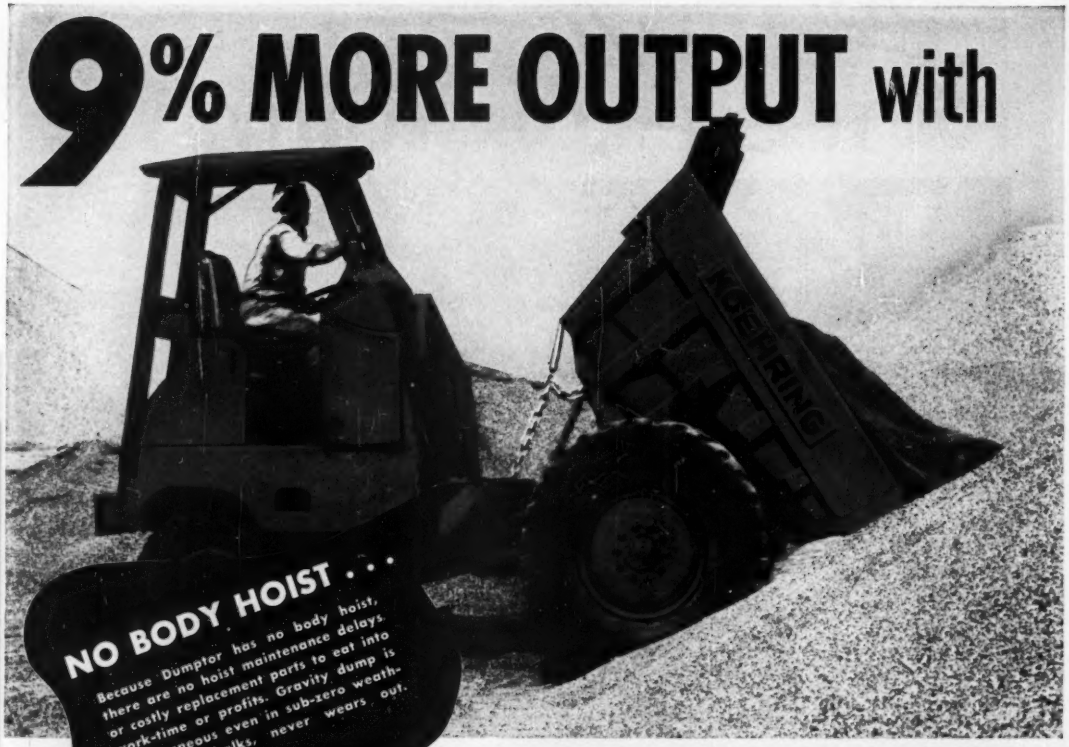
AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A.

BUILDERS OF ROAD MACHINERY

Austin Western

SINCE 1859

9% MORE OUTPUT with



NO BODY HOIST . . .

Because Dumptor has no body hoist, there are no hoist maintenance delays or costly replacement parts to eat into work-time or profits. Gravity dump is instantaneous even in sub-zero weather; never balks, never wears out.

In addition to 1-second gravity dumping, Koehring Dumptor is fast spotting at the hopper or edge of bank. There's no slow jockeying back and forth. With same speeds forward and reverse, Dumptor drives up, body forward, dumps and heads back without turning.

Fast-cleaning, scoop-shaped body has all-welded sides, ends and bottom heavily-reinforced with 4" channel ribs for rock service. More than triple strength is built into steel-oak-steel bottom. Free-swinging kick-out pan adds another steel layer for extra protection.

1-SECOND GRAVITY DUMP

IT takes just one second to dump a full 6-yard load with Koehring heavy-duty Dumptor. Operator trips the body release lever and gravity instantly tilts the scoop-shaped body 70° . . . one second later the body is empty, and Dumptor is on its way back for another load. Because there's no waiting for slow-acting body hoists, Dumptor saves 15 to 25 seconds every dump. This adds up to important gains in yardage output. At 16 trips per hour on a 1,000′ haul, 20 seconds dumping time saved on every cycle gains 5.3 minutes more productive haul-time . . . adds 9% to hourly yardage output.

This is typical of Koehring Dumptor's basic principle . . . to reduce all non-productive time to the absolute minimum . . . and to increase work-time for more yards per hour, more profit per yard *for you*. Dumptor has many other cost-cutting advantages worth checking . . . see your Koehring distributor.

KOEHRING COMPANY, Milwaukee 16, Wis.

KEEO

KOEHRING (KOEHRING HEAVY DUTY) **DUMPTOR®**

SUBSIDIARY COMPANIES: KWIK-MIX • JOHNSON • PARSONS

This Is Really One For The Book!

FEW PEOPLE would expect a blasting cap plant to be one of the safest places to work. Yet Atlas workers, on December 6, 1950, completed five years of making Manasite blasting caps and electric blasting caps without a single lost-time injury! During this period, they produced well over 250,000,000 of these detonators.

The last injury serious enough to send an employe home from work, five years ago, was a wrenched back. The one before that, a bruised ankle. In fact, no lost-time injury has been caused by an explosion in the plant since Atlas converted to Manasite blasting caps and omitted fulminate of mercury as an ingredient in these products some twelve years ago.

Little did anyone realize, then, the new degree of safety which would be made possible in the plant, as well as in the quarries, mines and construction jobs where blasting caps are used. Thanks to pioneering by Atlas research, engineers and experienced production employes, the safety of making and using blasting caps has made a great forward stride. Manasite detonators give greater effectiveness to the safety precautions which must always be followed in handling explosives.

Manasite is typical of Atlas contributions to safer, more effective, and more economical blasting. That's why you can expect to get the *right* answers to blasting problems from Atlas—originator of Manasite detonators and the famous ROCKMASTER "16" Blasting System.

Rockmaster and Manasite: Reg. U. S. Pat. Off.

ATLAS EXPLOSIVES *"Everything for Blasting"*

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

MACKS make light of heavy loads . . .

Big Mack super-duty trucks make the hard jobs look easy... because in design and construction they incorporate numerous outstanding features that contribute to easy maneuverability, ease of control and positive traction regardless of terrain.

Powerful Diesel Engines! Hydraulic Power Steering! Air Assist Clutch! Flexible Rubber Shock Insulators! Mack's famed Balanced Bogie and Power Divider. All are Mack features that assure power and strength for the heaviest loads; flotation and traction for the most slippery mud or sand.

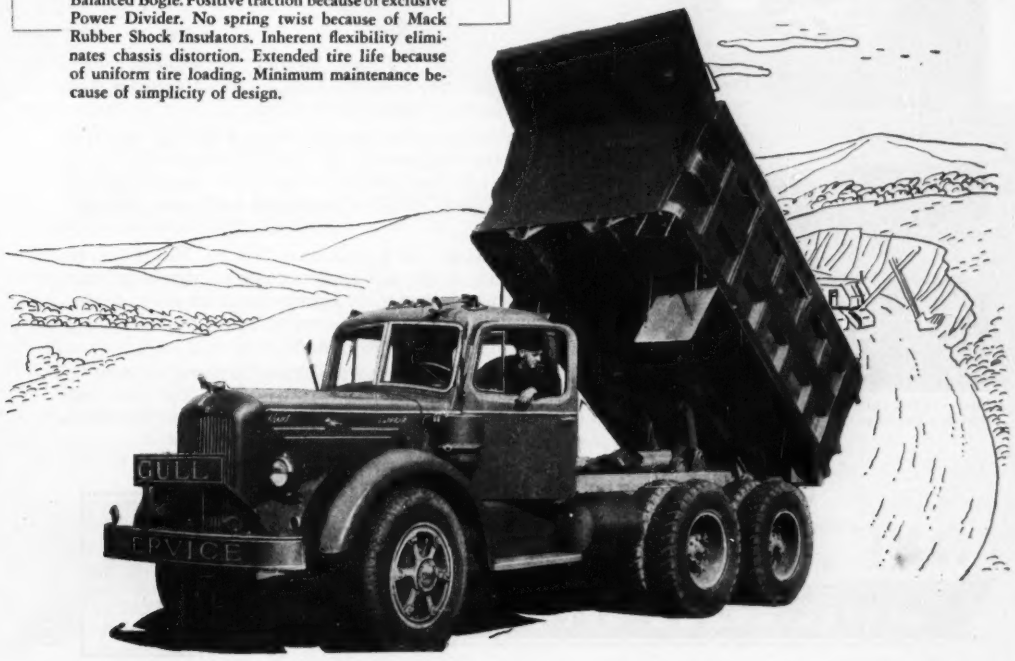
Your nearest Mack branch or distributor will give you the full story on what Macks can do for you in trouble-free, uninterrupted schedules... greater profits through greater output at lower cost. You'll find it's a story well worth hearing.

Only Mack gives you all the advantages of the famed Balanced Bogie. Positive traction because of exclusive Power Divider. No spring twist because of Mack Rubber Shock Insulators. Inherent flexibility eliminates chassis distortion. Extended tire life because of uniform tire loading. Minimum maintenance because of simplicity of design.

Mack TRUCKS

...outlast them all

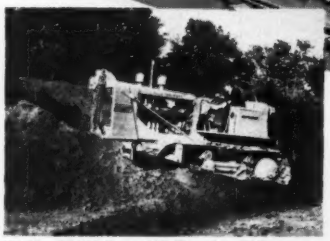
Mack Trucks, Empire State Bldg., New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; Long Island City, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.



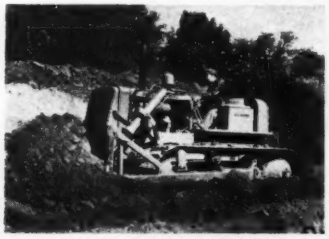
OUT AHEAD

with GM DIESEL POWER!

HD-20—41,800 lbs. of properly balanced weight; long, wide sure-gripping tracks and the new GM 6-110 Diesel engine driving through hydraulic torque converter give the Allis-Chalmers HD-20 brute strength to take toughest jobs in stride.



HD-15—27,500 lbs.—102 Drawbar H.P.—powered by a 6-cylinder GM Series 71 Diesel engine.



HD-9—18,500 lbs.—70 Drawbar H.P.—powered by a 4-cylinder GM Series 71 Diesel engine.

General Motors 2-cycle Diesel engines supply the hard-hitting power that enables Allis-Chalmers' great new line of tractors to outwork all others.

Four and six-cylinder GM Series 71 engines driving the HD-9 and HD-15—and the powerful new GM 6-110 engine driving the HD-20—give these new tractors a reserve of smooth, dependable power for easy handling, increased work and minimum maintenance.

The greater efficiency of 2-cycle operation and direct fuel injection simplifies design and enables these engines to produce far more horsepower than other Diesels of equal size and weight. Interchangeability of Series 71 engine parts provides maximum availability—keeps them on the job.

That's why GM Diesel engines are chosen to power not only the "World's most modern line of crawler tractors"—but more than 500 different kinds of machinery built by 120 manufacturers.

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES... Up to 275 H.P. **DETROIT 28, MICHIGAN** MULTIPLE UNITS... Up to 800 H.P.

GENERAL MOTORS

GM GENERAL MOTORS DIESEL POWER

DIESEL BRAWN WITHOUT THE BULK

MORE MILES OF MOTION

Homocord CONVEYOR BELTS

Round and round—up and down they go, taking the hard impact of heavy loading . . . and still coming back for more . . .

Users tell us there are more ton-miles of rugged service in Homocord Conveyor Belts than in any other. This is not accidental; we engineered Homocord specially for heavy duty conveying. It cushions load-impact. It troughs naturally, needs less training. It's flexible, yet it's strong.

Bulletin 6906, mailed on request, presents convincing proof.

Our hose, V-belts and flat belts, too, are engineered for extra long life. Ask your R/M Representative.

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose • Fan Belts • Brake Linings • Brake Blocks • Clutch Facings • Packings Asbestos Textiles • Powdered Metal Products • Abrasive & Diamond Wheels • Bowling Balls

10 GIANT-SIZED speed OAHE DAM fill

3 30-yd. and 7 22-yd. units deliver 667 pay yds. hourly on 1½-mi. cycles

With approximately 3½ million yards of sand, gravel, clay and shale to move on Oahe Dam subcontract at Pierre, South Dakota, Campbell & Collins Joint Venture of Fargo, N.D., assigned 80% of total dirtmoving to 10 giant-sized, rubber-tired A Tournapulls. Seven of the 240 h.p., two-wheel "A" prime movers were coupled to 25-ton (22-yd.) E-25 Carryall Scrapers and three to 35-ton (30-yd.) E-35 Carryalls. Here's a report on how their performance is speeding this Missouri River flood control project:

When these pictures were taken, the fleet was hauling tough, sun-baked sandy clay from 2 pits, one with loading on the level and the other with loading down 35% grades. Time and distance for obtaining loads varied widely, even within the same pit, due to necessity of selecting soil to meet U. S. Engineer fill requirements. In the level pit, two 144 h.p. pushers teamed up to help Tournapulls get heaped loads in 70 to 115 seconds (average, 93 seconds) with a load distance 175 to 250 ft. In the downhill pit, using one 144 h.p. pusher, Tournapulls cut load time to 25 to 55 seconds (average, 38 seconds), and load distance to about 75 ft. From both pits, the E-25 Carryalls were getting average loads of 16 pay yards ... the larger E-35's, 21 pay yards.

Haul cycles from both pits averaged 1½ miles ... with 3700 ft. of favorable 9% grade to dump and 4225 ft. of adverse 0 to 14% grades on return. Giant 4-wheel air brakes—with 1812 sq. in. of braking surface on each wheel—permitted safe use of haul speeds up to 34 m.p.h. Dumping on the run helped each electric-control Tournapull complete a 7,925-ft. round trip every 13.1 minutes. On the basis of 50-minute efficiency, that's 3.8 trips per hour per unit, and an hourly output for each of the 7 E-25 scraper-equipped rigs of 61 cubic yards and for each of the 3 E-35's of 80 cubic yards.

Drive 190 miles to Pierre

Six of these Tournapulls are veterans of another big earthfill project—the Shadehill Dam, built across the Grand River near Lemmon, South Dakota. Their efficiency record on this job for the entire 1949 season was 85%. When their work here was finished, the 6 rigs drove under their own power to Pierre ... a 190-mile trip through main highway traffic.

Like Campbell-Collins, it will pay you to investigate the big pay loads and new low dirtmoving costs possible on your work with these mobile, 35-ton (30-yd.) and 25-ton (22-yd.) A Tournapulls. Your LeTourneau Distributor has all the facts ... call him, or write TODAY.

After Tournapulls spread their loads, 3 tractor-drawn Tournapackers roll fill to specified density.

LETOURNEAU LET EQUIPMENT

Mail Today to: R. G. LeTOURNEAU, Inc., Peoria, Illinois

☐ Please furnish more information about your BIG Tournapulls.

Name_____ Title_____

Company_____

Street_____ City, State_____

Type of work to be handled_____

Also interested in:

☐ 35 m.p.h., 13.5-yd. C Tournapull

☐ 28 m.p.h., 7-yd. D Tournapull

☐ 19 m.p.h. C Tournadozer

"A" TOURNAPULLS for Campbell-Collins

By September, 1950, 6 of Campbell-Collins' A Tournapulls had worked 4000 hours each on Shadehill and Oahe Dams . . . 4 newer "A's" had clocked 500 hours each here at Oahe. The Oahe job is being subcontracted from Guy H. James Construction Company of Oklahoma City, Oklahoma.

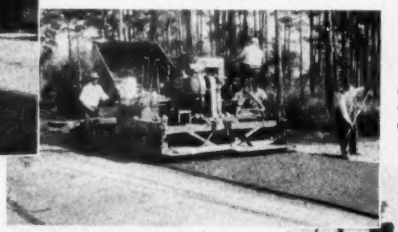
Tournadozer, Tournapull, Carryall, Tournapacker—Trademark Reg. U.S. Pat. Off. C141

LETOURNEAU PEORIA, ILLINOIS — JOB-PROVED Over 7150 Built and Shipped — **TOURNAPULLS**

FOR LOWEST NET COST PER YARD

North Carolina tops worn highway with 25 miles of Texaco

Route 301, North Carolina, before construction of new Texaco Asphalt surface.



Laying the first of two courses of plant-mixed Texaco Asphaltic Concrete.

Contractor: Adams and Tate Construction Company of Roanoke, Va.

Old pavement with tack coat of Cutback Asphalt (right); first course of Asphaltic Concrete (left).

Route 301 is one of North Carolina's principal north-south highways, a popular route with many Florida-bound motorists. Last summer, a 25-mile section of this highway south of Fayetteville had deteriorated to the point that some type of improvement became imperative.

The method used by North Carolina to modernize this busy highway is economical, causes minimum inconvenience to traffic and gives the old, worn pavement a new, durable, joint-free wearing surface. Following a light tack coat of Texaco Rapid-Curing Cutback Asphalt, a resilient, heavy-duty Texaco Asphaltic Concrete pavement was constructed in two courses with a combined thickness of 3 inches. The 85-100 penetration asphalt used in the asphaltic concrete mix, also was used as a tack coat between the two courses.

In North Carolina and throughout the rest of the country east of the Rockies, road builders have been constructing and maintaining streets and highways with Texaco Asphaltic products for over 45 years. Refined from selected crudes, this complete family of Asphalt Cements, Cutback Asphalts and Slow-Curing Asphaltic Oils includes a product exactly suited to each road and street need.

Two helpful booklets which describe all types of Asphalt construction can be secured without charge by writing our nearest office.

Note the volume and type of traffic which is served by this State highway.

Completed Texaco Asphaltic Concrete pavement provides smooth, durable, skid-resistant riding surface.

THE TEXAS COMPANY, Asphalt Sales Dept., 135 E. 42nd Street, New York City 17

Boston 16 Chicago 4 Denver 1 Houston 1 Jacksonville 2 Philadelphia 2 Richmond 19

TEXACO

REG. T.M.

TEXACO ASPHALT

COLD WEATHER AHEAD, TOO*

"HERE'S THE ANSWER!"

* U. S. WEATHER BUREAU reports show Northern and Central States are still due for this season's lowest temperatures.

There's more severe winter to slow construction jobs for the builder who isn't prepared. You're money ahead when you look ahead to cold days and get a Herman Nelson Portable Heater working for you.

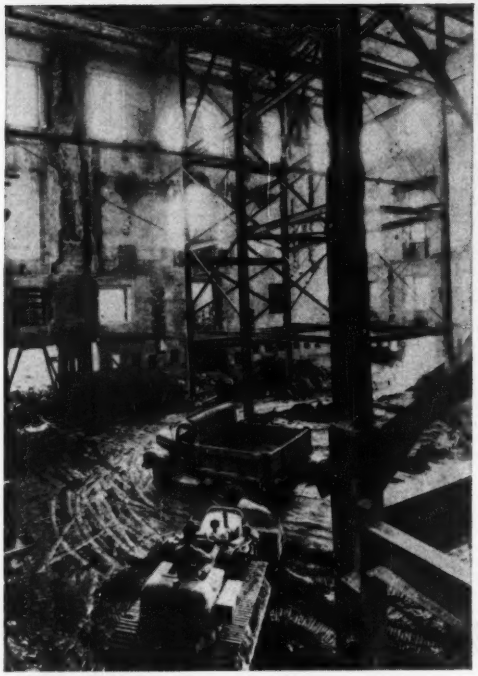
These adaptable units heat, dry, thaw and ventilate without expelling dangerous fumes, smoke and carbon monoxide into enclosed areas. A combustion chamber and stack prevent contamination of air that can cause workmen to become inefficient or ill. Fire hazards are minimized. You get cleaner, safer heat for every fuel dollar.

MAKE A DEAL with your nearest Herman Nelson distributor. For his name, write to Dept. CM-1 at the address below.

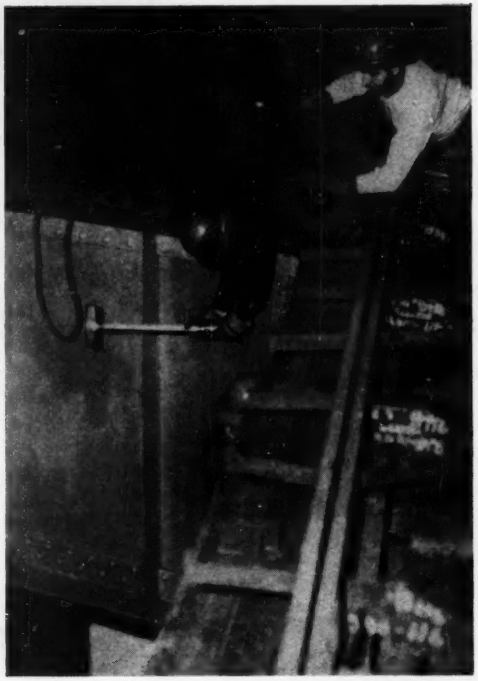
AAF herman nelson

HERMAN NELSON DIVISION
AMERICAN AIR FILTER COMPANY, INC.
Moline, Illinois

Construction News in Pictures . . .

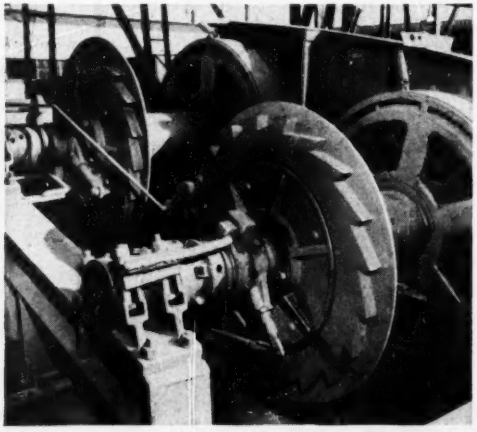


EMPTY HOUSE—The White House in Washington looks completely gutted but, of course, it's only part of $5,400,000 repair and restoration job. These two Allis-Chalmers HD-5G tractor-shovels handle interior cleanup carefully, have helped uncover historic souvenirs (including bottle of ancient rye whisky). General contractor is John McShain Inc., Philadelphia, while Spencer, White & Prentis Inc., New York, are doing underpinning.—Photo by Abbie Rowe, courtesy National Park Service.



SUPER'S JOB—With night traffic temporarily halted and two big cranes holding an 8-ft deep plate girder in place, Harold Horton, erection superintendent for Harris Structural Steel Co., New York City, tells his rivet man to take a firm hold on his belt while he drives home drift pin. Girder is first of six which form final link between elevated ramps and new bus teminal of Port of New York Authority. See Construction Methods and Equipment, September 1950, page 47, and page 64 this issue.

FREE RIDE—Truck hauling stone to ocean jetty for San Diego's Mission Bay Projects gets turned around to shorten backing distance. Devised by Clyde W. Wood Inc., Los Angeles contractors, truck turntable is skidded to place about 100 ft back of stone-setting crane at end of 3,400-ft jetty, which is only 20 ft wide. Method saves time and truck wear; lets Wood use longer trucks.



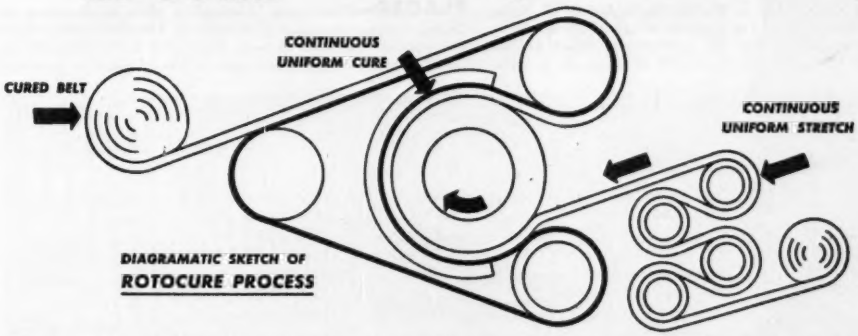
SAFETY DOGS—To prevent accidents should brakes or engine fail during heavy lifts, Bevis Machine Co., Los Angeles, welded these safety dogs to hoist. They are flame cut from 2-in. mild steel, welded to hoist drum with ¼-in. Fleetweld No. 5 rod at 300 amps. Idler of 1¼-in. plate, designed to follow itself, engages dogs and holds drum rigidly.—Lincoln Electric Co. Photo

(Continued on page 36)

ROTOCURE Eliminates this "Achilles Heel"*

* Overcured sections which occur every 30' to 40' are the primary cause of failure in belts made by the flat press method. You won't find these "Achilles Heels" of double vulcanization in BWH Conveyor Belts.

WITH BWH Conveyor Belts



DIAGRAMATIC SKETCH OF
ROTOCURE PROCESS

Curing a small segment of rubber belting *twice* is unavoidable when belts are made under the conventional flat press method. With this "stop and go" technique, a cured segment is advanced slightly less than a press length. As vulcanization is resumed, an overcured segment results due to overlapping. This twice-cured segment is a critical section or "Achilles Heel" of about 2 to 4 inches in length and the width of the belt. It is responsible for structural weaknesses and excessive surface wear which cause early belt failure and high maintenance costs.

To solve this problem, BWH technologists pioneered the ROTOCURE process of *continuous* vulcanization whereby every *inch* of belting receives the same, *uniform* curing treatment. Here are 4 important reasons why ROTOCURE has paid off for users throughout industry, in installation after installation—by longer service life before replacement.

1. Because there is no double vulcanization, uniform abrasion-resistant covers are always assured.
2. A continuous vulcanization eliminates the overlaps which can reduce flex life up to 40%.
3. Mechanical distortion (inherent with flat press curing at the press ends) is eliminated.
4. Constant uniform stretch results at all times.

As with conveyor belting — so with transmission belting, the BWH ROTOCURE process provides all these advantages plus a higher coefficient of friction because dusting agents are not required in the manufacture with ROTOCURE.

Call in the BWH distributor or write us direct for the full story of ROTOCURE and what it can do for you in keeping conveyor belts working efficiently longer — and holding belting costs down to earth.

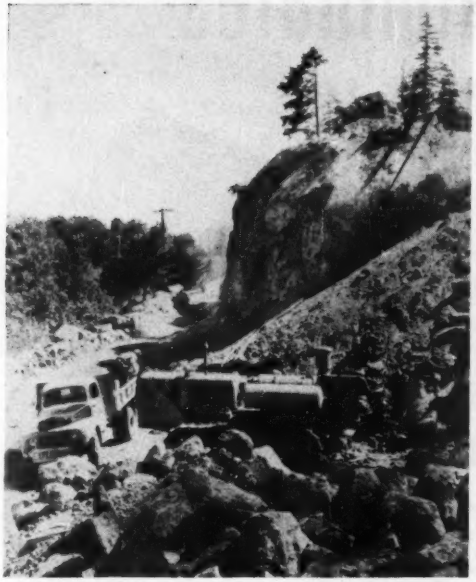
Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

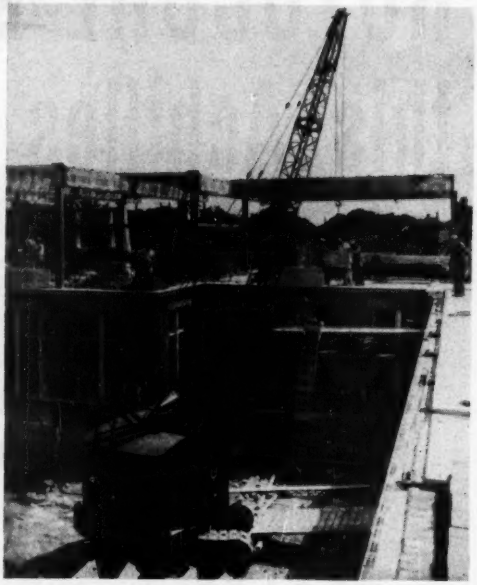
Distributors in all Principal Cities

PLANT: CAMBRIDGE, MASS. • P. O. BOX 1071, BOSTON 3, MASS., U. S. A.

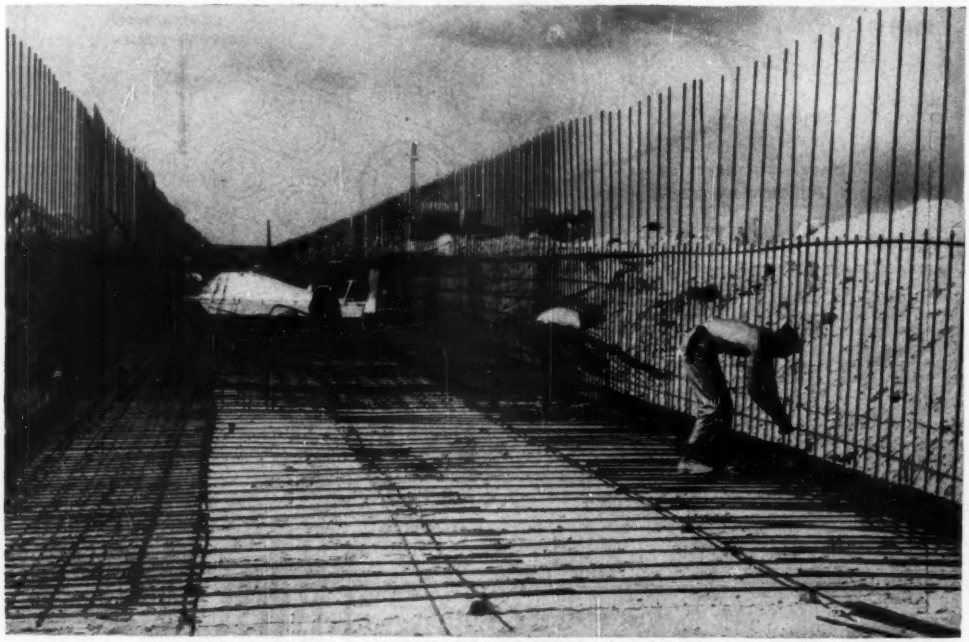
BWH
DEPENDABLE RUGGEDNESS



WIDENED—Rock hill is blasted for widening of Route 30 (Columbia River Highway) in Cascade Mountains 45 mi east of Portland, Ore. Peter Kiewit Sons' Co., contractor for 5¼-mi $1,000,000 job, rigged I-R compressor on Cat D8 to supply air to drills.



PLACED—Cast stone is inched to place on dormitory for Chicago's Angel Guardian Orphanage by Link-Belt Speeder crane with precision hydraulic controls. Contractor E. H. Marhoefer Jr. Co., Chicago, casts his stone right on site of two-story structure.



BOXED—Because this section of West Canal on Bureau of Reclamation's Columbia Basin Project near Ephrata, Wash., drops 63 ft in 1 mi (vs only 6 in. per mi on standard sections) it is built as box-like concrete chute. Structure is 18 ft wide and 1 mi long, with 10-ft vertical walls. Capacity is 2,600 cfs. It's part of Morrison-Knudsen's 14-mi $6,136,000 job. *(Continued on page 38)*

WHERE YOU SEE *this*... YOU SEE

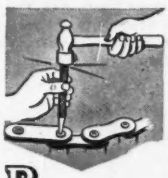
Longer Chain Life, Lower Chain Cost, Easy Adjustment, Faster Service!

This distinctive link marks the new "BA" . . . Baldwin Assembly . . . riveted roller chain. And it's the mark of long, low-cost service.

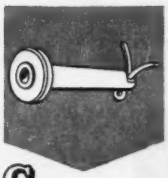
The new "BA" assembly roller chain gives you all the advantages of riveted roller chain . . . longer life . . . even greater ease of field assembly and disassembly than with old style detachable roller chains . . . and in single strand, lower cost.

HERE'S HOW SIMPLE IT IS TO TAKE APART *THIS* ROLLER CHAIN!

A The single pin connector is the heart of the "BA" assembly and is readily identified by its distinctive shape. One pin in this link has a cotter on one end; the other end is spun over a washer. The other pin is fully riveted to the adjacent link, thus assuring the assembly of the superior life of riveted chain.



B To take the chain apart, simply remove the cotter on the single pin connector link and drive out the pin. Pin is a slip fit through the chain except for a milled flat on the cottered end which is fitted into a special hole in the connector plate. There is no danger of destroying fits or damaging parts with this chain.



C The single pin connector of the "BA" assembly fits snugly into place . . . even though it is a slip fit through virtually the entire link. The washer spun over one end of the pin and the milled flat on the cottered end that is fitted into the special hole in the connector plate, plus the cotter, hold the pin firmly in place.

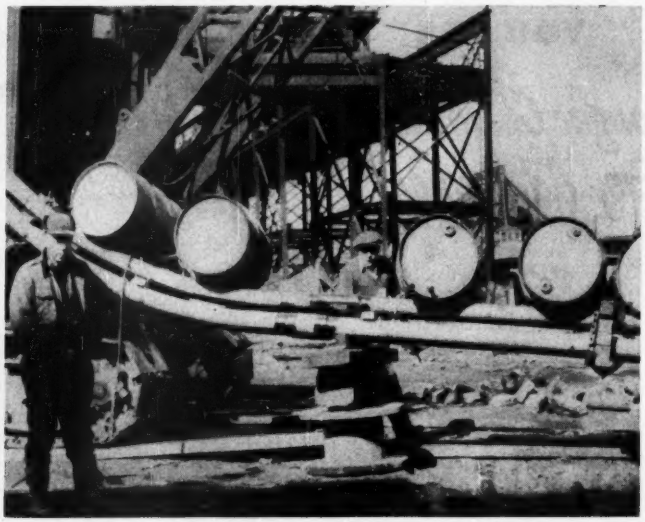
D An important advantage to you is the fact that the other end of the single pin connector link is firmly riveted to the adjacent link. When the single pin connector is removed, this riveted pin holds the chain parts together, thus keeping plates in line and preventing them from falling out, simplifying assembly.

For all the facts on "BA" assembly, write Chain Belt Company, Baldwin-Duckworth Division, 300 Plainfield St. Springfield 2, Mass., and ask for Bulletin 50-6.

BALDWIN·REX
ROLLER CHAINS

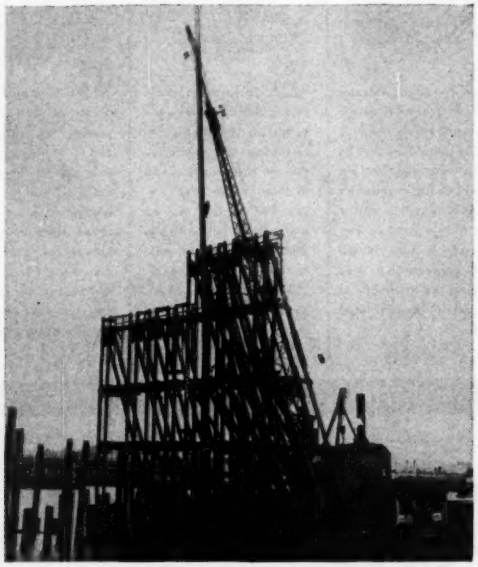
a complete line from ¼-inch to 2½-inch pitch

SUNK—Huge 250-ton derrick boat Monarch raises 150-ton bow section of dredge Sandcraft, sunk in New York Harbor. Merritt-Chapman & Scott Corp., contractors for job for New York District, Corps of Engineers, fitted prefabricated 22x23-ft timber and steel cofferdam 26 ft high to dredge's deck and used it as access to interior. Demolition charges break ship for removal.



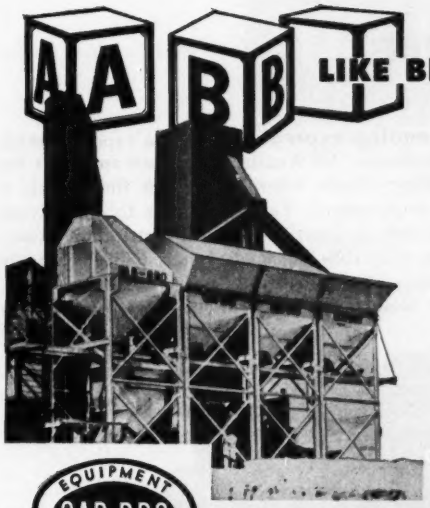
FLOATED—Assembly of heavy wrought iron conduits is fitted with sealed empty oil drums for floating into position on Vernon Ave. Bridge job over Newtown Creek, New York City. Crawler crane will launch conduits, and floating rig will tow buoyant assembly to site, where drums will be cut free to sink conduits to channel bottom. Fehlhaber Pile Co., New York, is contractor.

SPLIT—Steel wedge hooked to bulldozer blade of Caterpillar D8 tractor splits giant Sequoia tree in Dillon Wood tract, California. Shaft of wedge fits into steel sleeve that allows 14 in. of travel. Thus, machine can draw back without dislodging wedge, then slam forward to drive point in. Method is successful for splitting Sequoias, which are remarkably brittle.—Wide World Photo



SET—Multiple-lead scow positions 8-pile bent section for 1,000-ft Weehawken (N. J.) pier being built by J. Rich Steers, Inc., New York City. Scow is 33x110 ft; mounts eight 60- and 80-ft leads of 6x12 timbers braced by 4x10s. Here, 20-ton whirler crane with 110-ft boom and 30-ft jib sets 135-ft pile for driving with McKiernan-Terry 10-B-3 hammer.—F. R. Baxter Photo

A A B B LIKE BLOCKS... *They Fit Together*



ANY STORAGE PROBLEM can be handled with the Gar-Bro Unit Batch Plant—it's an assembly of four storage bins including single and dual aggregate bins, cement bin and cement silo. These units can be set up in any combination to handle aggregate and/or bulk cement and are easily transported and re-arranged to suit the next job.

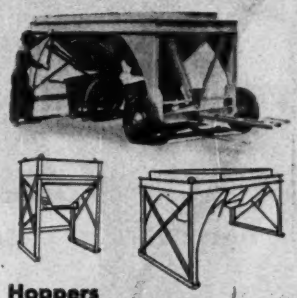
Double rails, on each unit, lock together to carry a traveling weigh hopper equipped with multiple-beam scale. Weigh hopper is adjustable to discharge from either side or either end. Write for bulletin.

GAR-BRO UNIT BATCH PLANTS

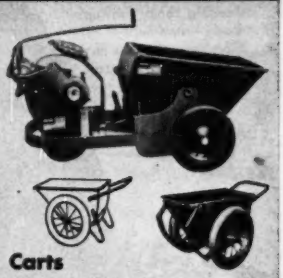
EQUIPMENT GAR-BRO ENGINEERING SERVICE

EVERYTHING FOR FASTER HANDLING OF CONCRETE

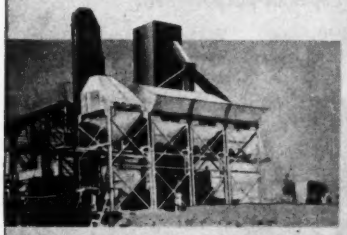
Buckets
World's most complete line —25 models ranging from ½ to 8 cu. yd.



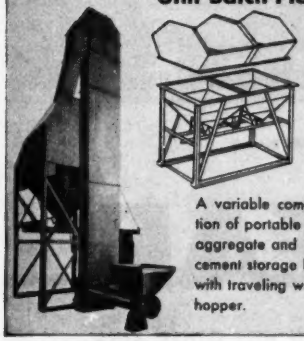
Hoppers
Includes portable, tower and floor hoppers (28 models) with cap. to 10 cu. yds.



Carts
Power-carts with concrete tray, box tray or platform (cap. up to 14 cu. ft.—2000 lbs.). Also six models of hand-push concrete carts.

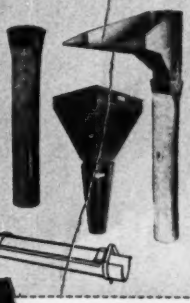


Unit Batch Plants

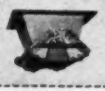


A variable combination of portable aggregate and cement storage bins with traveling weigh hopper.

Chutes
A complete line of concrete collection hoppers, steel drop chutes, rubber elephant trunk & line chutes.



Barrows
complete line (35 models) with steel or aluminum trays and with wood or steel handles.



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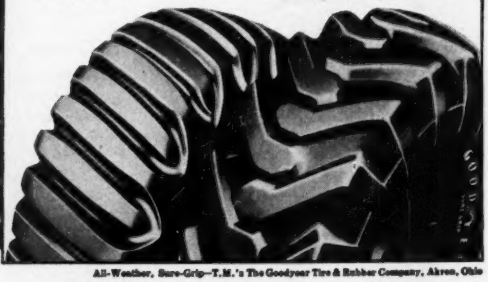

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Volume 33 • Number 1

CONSTRUCTION
METHODS AND EQUIPMENT

JANUARY, 1951

Harold W. Richardson, Editor

Let's Go!

OUR LEGENDARY CHARACTER Spike Hennessey expresses our thoughts this month in the cartoon below better than we can in words. By Presidential proclamation the country is in a state of national emergency. The people received that proclamation calmly; they face the uncertain trials and tribulations ahead with equal calm. But that calmness does not stem from complacency, for behind it is a grim determination to carry on, to make our country strong and keep it that way. For once the people were ahead of their leaders, they were ready for all out mobilization.

The construction industry is ready for any job it may be called upon to do. It is stronger, better equipped, more experienced and better manned than ever before. So vital a part of the country's economic life and progress in peace, construction becomes even more important in times of national emergency. Industrial production is the nation's might, and construction is backing up that productive capacity.

But to best serve the country in its hour of need, construction must be kept strong, and must be kept rolling. It is not something that can be turned on and off like a water spigot. Its momentum could be slowed by too much curtailing of so-called non-essential projects before more essential work is available to take their place. We can keep construction rolling, and thus ever ready for any emergency, by setting up high priorities for military projects and highly essential civil works. Then, under proper price and wage controls, the remaining resources of the industry could be utilized on other construction work and fed into essential projects as needed.

As these words are being written news comes from Washington that Frank R. Creedon will head the NPA new facilities and construction bureaus. Here's a top construction man who knows the score. Capable John Haynes will head up the building materials branch, and Jim Follin, another veteran, will be in charge of construction controls.

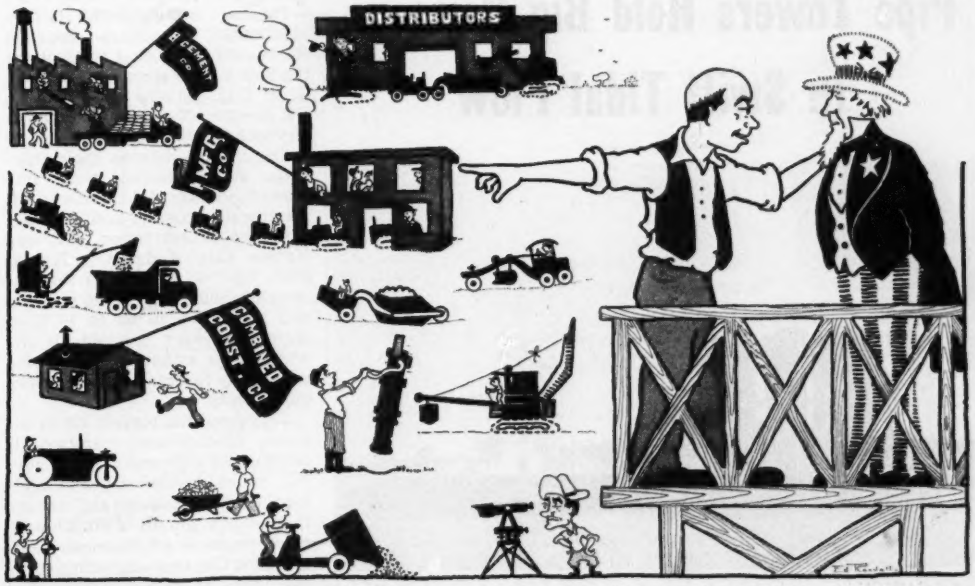
From these and other gentlemen who will direct the mobilization of construction and all other industries, we look for intelligent planning, for judicious and efficient use of construction's might.

Construction is ready to go, but we want no pussy-footing, no pampering, no halting in applying its powers.

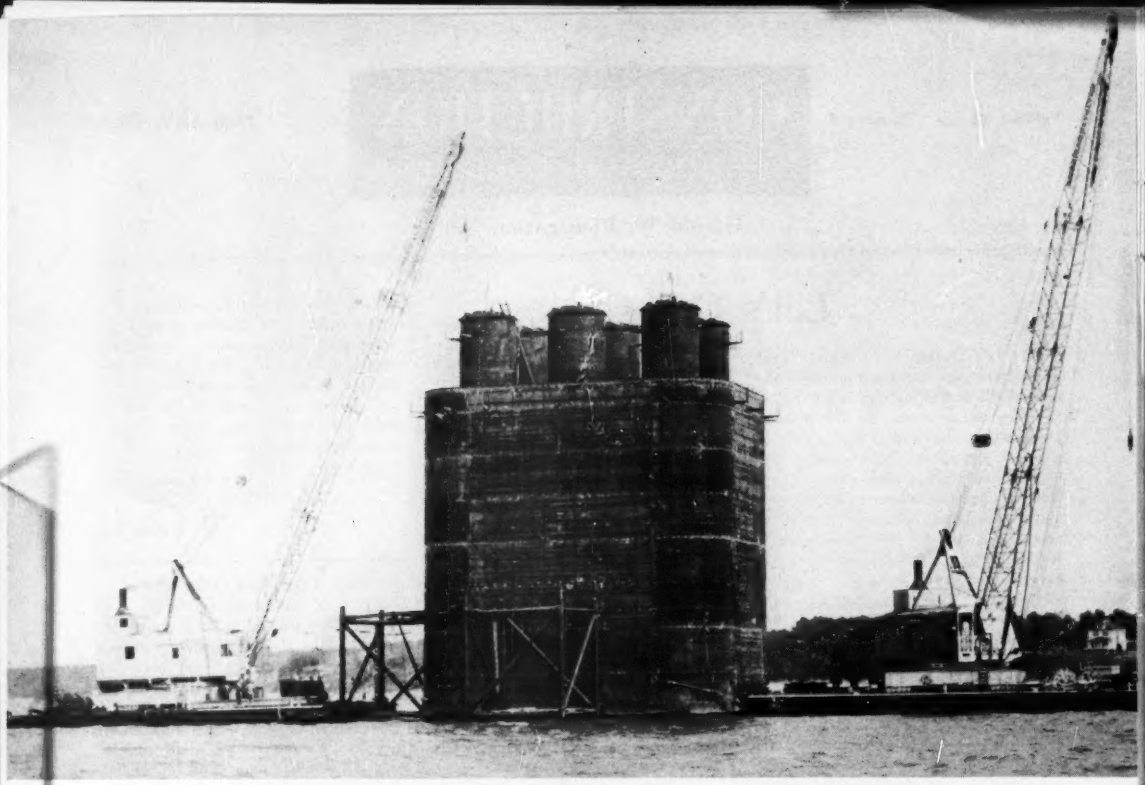
Let's go!

Rich

ON THE COVER—Coming at you on the base of Oahe Dam on the Missouri River above Pierre, S. D., is one of ten Model A Tournaroadsters pulling E25 and E35 scrapers. They belong to Campbell-Collins, subcontractor for 3½ million yd of the 6 million yd Guy H. James took as Stage I earthwork on the big dam. Six million yd is only the beginning, for the dam calls for 73,000,000 cu yd of rolled fill. Oahe Dam is a U. S. Corps of Engineers assignment under the Pick-Sloan plan for development of the Missouri Basin. (See article on page 85, this issue)

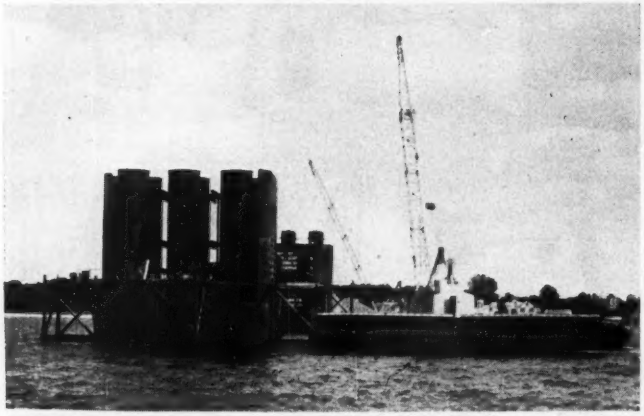


SPIKE SEZ: Uncle, the entire construction industry is back of you to a man. Just let us know what you want us to do and we'll do it pronto. We fought by your side in the last war, and we'll do it again, only much better. Right now the capacity of contractors, labor, engineers, equipment and material firms to produce is the greatest of all time. Let's go!



BIG STEEL CAISSON for York River Bridge, still afloat, has just been backed into pipe tower guide cage. Caisson won't be landed on bottom until fourth tower and connecting yokes have been set at right end.

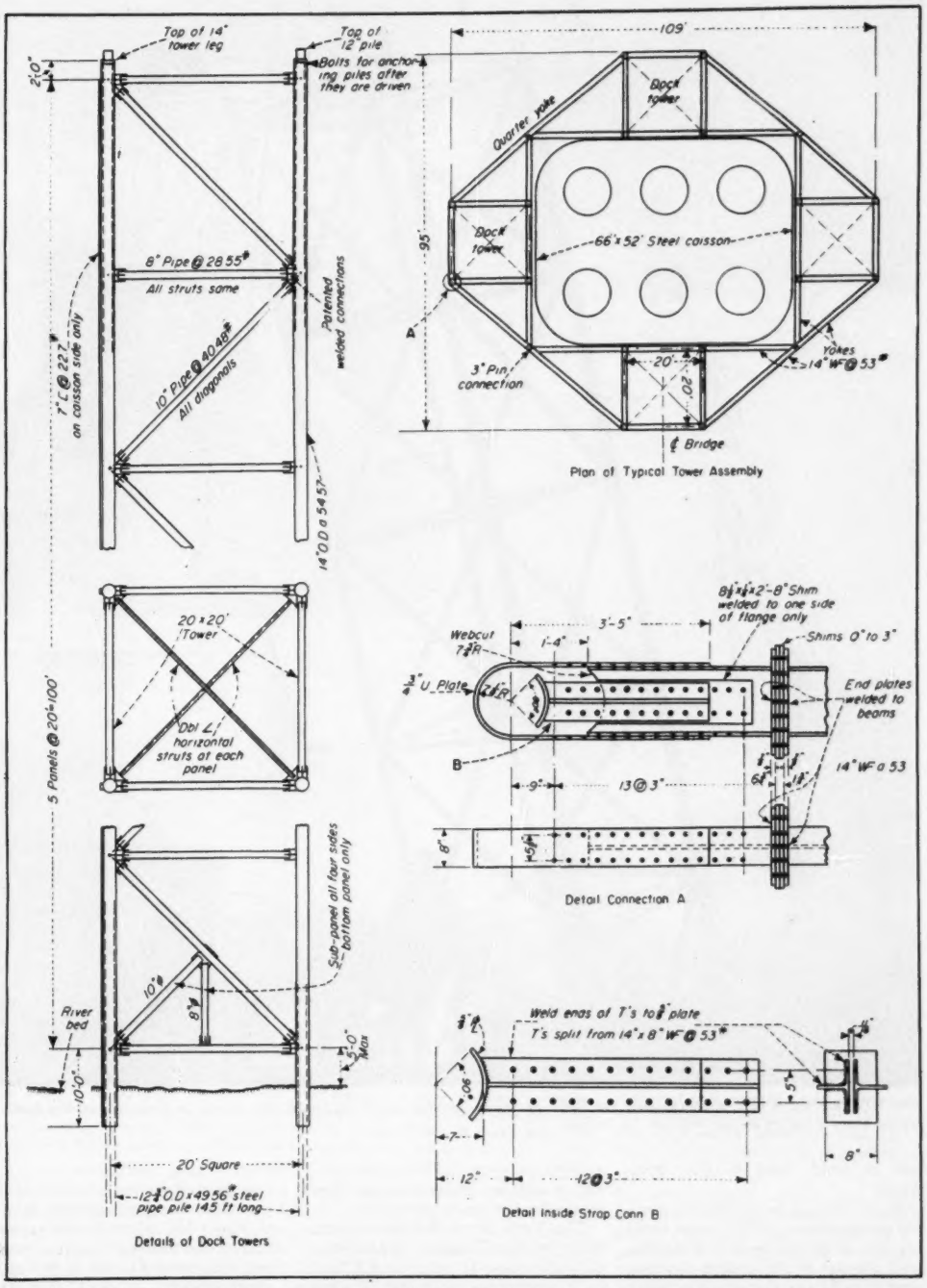
Pipe Towers Hold Big Caissons In Swift Tidal Flow



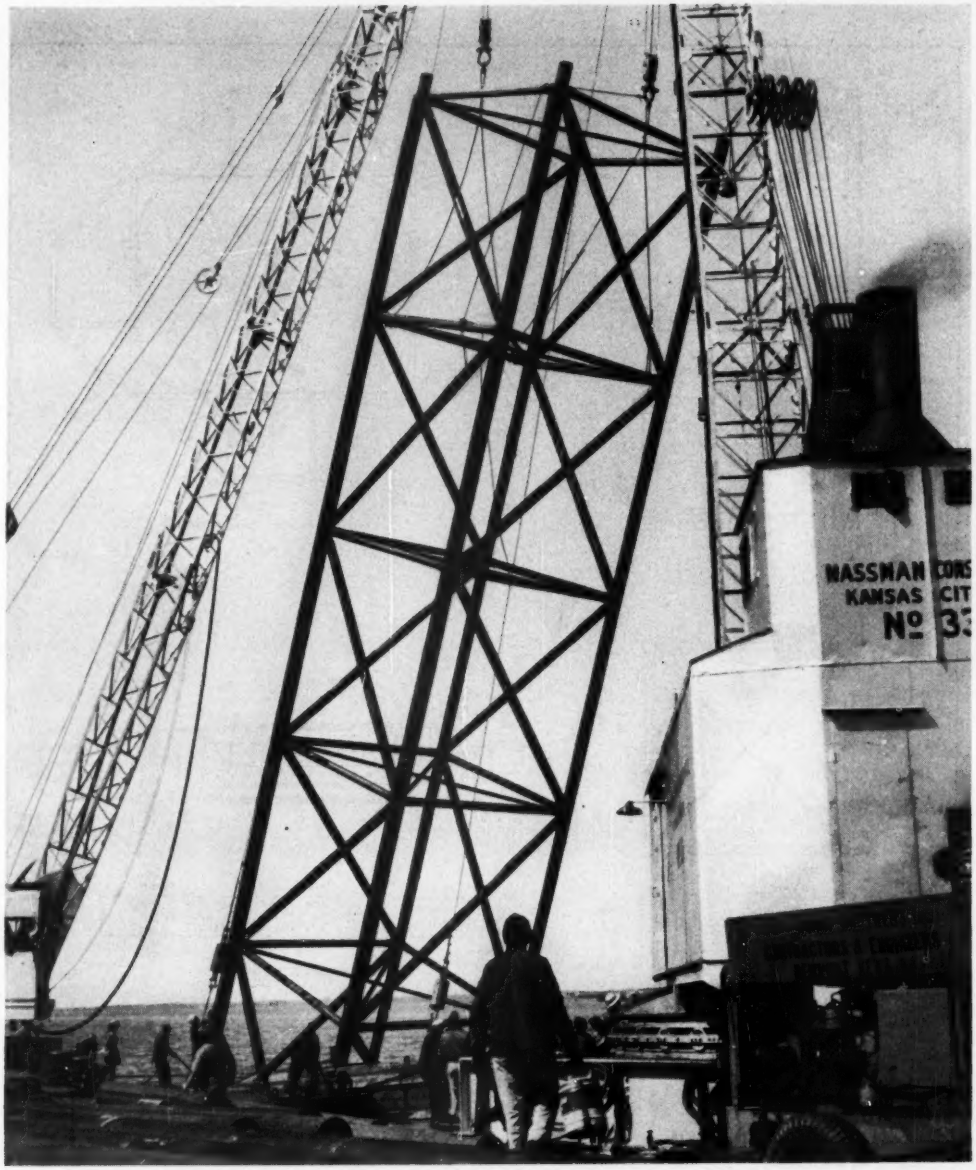
FIRST CAISSON has been landed and steel cofferdam sections are being erected on top of box preparatory to sinking operations. The six 12-ft open dredging wells have been extended to top of cofferdam.

THE CONSULTING ENGINEERS —Parsons, Brinckerhoff, Hall & MacDonald, New York—designed six beautiful big steel caissons for the new bridge spanning the York River tidal estuary at Yorktown, Va. Newport News Shipbuilding & Drydock Co. did a nice job in fabricating the caissons on their shipways and launching them into Hampton Roads. All there was left for the substructure contractors—Massman Construction Co. and Kansas City Bridge Co., Kansas City, Mo.—to do was to tow the ungainly shells 30 mi to the site and sink them in 60 to 80 ft of water to exact position in the wind-swept estuary with ripping tides ready to wreak havoc at every opportunity.

Just about the biggest job in the entire substructure operations is holding the caissons in place during the first critical stages of landing them in deep water and starting them down plumb. John Newell, chief engineer of Massman Construction Co., came up with a corking idea for caisson guides that eliminates the usual pile clusters and fenders, which would be diffi-



CLEVER CAISSON GUIDE SYSTEM is built around four main pipe towers that are pinned to bottom by pipe piles driven through tower legs. Towers are braced by horizontal yokes of 14-in. beams, fastened to tower legs by ingenious adjustable straps, as shown here in detail. Overlapping bolt holes permit adjustment in 3-in. increments; and down to ⅛ in. by shims between welded end plates. Towers are further braced by adjustable pipe knee braces (not shown) extending from tower leg to center of quarter yoke.



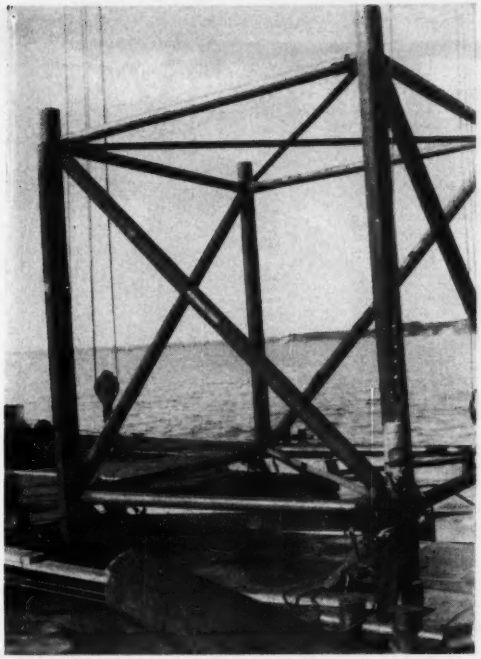
PIPE TOWERS, 112 ft high, are completely fabricated on shore, delivered to site by barge, and are set in place by two big floating cranes. Here is one on its way down to river bottom.

cult to hold rigid in that deep water.

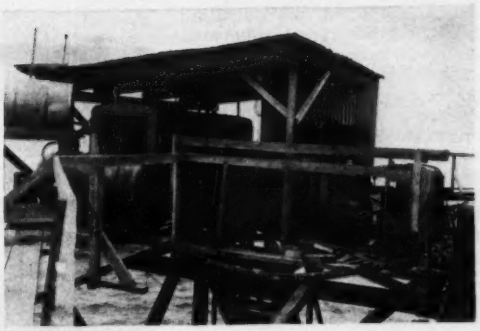
Newell's plan for guides is a simple arrangement of four pipe towers, one at each side of the caisson, well pinned to the bottom by long pipe piles driven through the tower legs. The whole assembly is braced and tied together by adjustable steel yokes. As the guide structure easily can be moved from one caisson to another, three sets are adequate for the six caissons.

The York River Bridge is being built by the Virginia Department of Highways. It will be 3,750 ft long, spanning the river between Gloucester Point and Yorktown. The main river crossing is made up of seven deck truss spans from 280 to 500 ft long, resting on six deep piers. Two of the spans swing open for a 450-ft clear navigation channel. River bed at the piers varies from El –60 and El –80. Pier bottoms vary from El –135 to El –150.

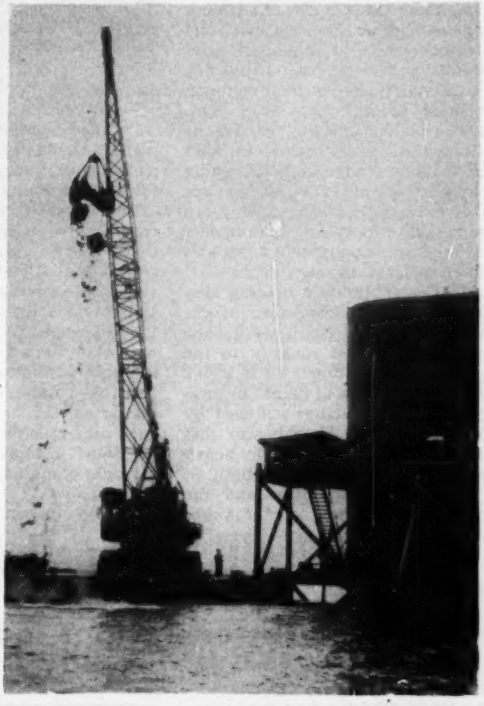
Prefabricated caissons, each fitted with six 12-ft dia open dredge wells, run up to 52x66 ft in plan and up to 111 ft high. Each caisson



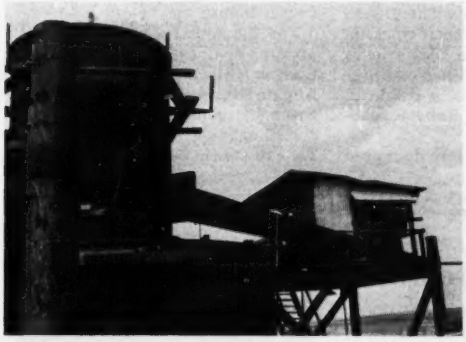
TOWER HAS BEEN LANDED, is now ready for pipe piles to be driven down through tower legs. Continuous channels, welded to near legs, are rubbing blocks for caisson. Welded connections of struts and diagonals to legs have been patented by contractor.



COMPRESSORS, welding machines and light plants are parked on convenient working platforms on quarter yokes. Detail at lower right-hand corner shows top view of adjustable clamp between yoke and tower leg.



COFFERDAM on top of caisson has been completed and clamshell dredging is under way through the six open wells. This view also shows one of telescoping pipe knee braces cutting across corner of cofferdam.



ADJUSTABLE QUARTER YOKES are key to tower bracing. Connection between tower leg bands and yoke beams is by bolting through overlapping bolt holes 3 in. apart. Precise adjustment is made by shims bolted between end plates welded to beams. Note how piles inside tower legs have been bolted and shimmed for added stiffness to tower. Bolt holes in piles are drilled to match pre-drilled holes in legs after piles are driven.

is topped by a steel cofferdam section extending up to 8 ft above mean tide. Reinforced concrete poured around structural steel walls and diaphragms complete the caissons when sunk to place. They are capped at El –40 to carry hollow pier shafts.

As can be seen from the accompanying drawings, the caisson guide system is built around four pipe towers, one placed at each of the four sides of the prefabricated caissons. All towers are identical, 20x20 ft square, 112 ft high. Legs are 14-in. OD pipe, braced by 10-in. pipe diagonals and 8-in. pipe struts in 20-ft panels. Horizontal cross-bracing at each panel is a pair of 3x4-in. angles, welded at the intersection. Along the full length of the legs facing the caisson is welded a 7-in. channel as a continuous rubbing block. The entire tower assembly is welded construction, with special pipe connections being patented by Massman.

Each tower leg, 13¼ in. inside dia, nicely takes a 12¾-in. OD pipe welded into a 145-ft pile. The

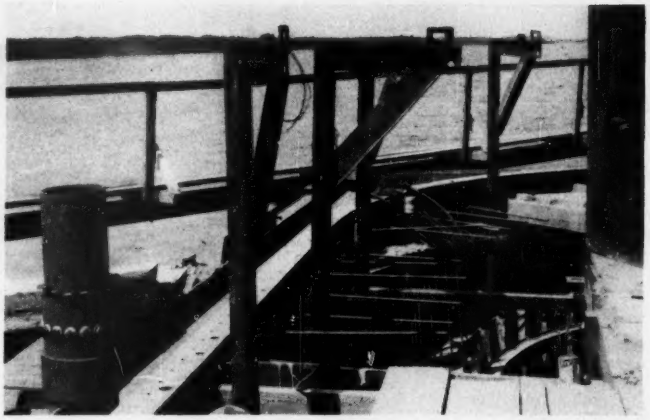
towers, completely fabricated into their 112-ft length, are delivered to the site by barge and are picked up and set in place by pair of floating gantry cranes. Then the pipe piles are driven through the legs, pinning the tower firmly in place. During fabrication a row of 16 holes is drilled through each tower leg 6 in. from the top. After the piles are driven, corresponding holes are drilled through the pipe piles for bolting the two members together, thus increasing the rigidity of the structures. Shims are also driven between inside top of legs and the piles for added tightness.

Yokes Tie Towers Together

A clever adjustable yoke arrangement ties the tops of adjacent towers together. Each quarter yoke assembly consists of four sections of 14-in. WF beams, with webs horizontal, pinned at their common meeting point with a 3-in. bolt. Each yoke engages the near legs of the two adjacent towers through an ingenious adjustable clamping band. Details of this connection are shown in the drawings. They are adjustable by 3-in. increments through overlapping bolt holes, and down to $\frac{1}{8}$-in. through shims.

Thus a tight, rigid bracing system is available regardless of exact position of the towers. The yokes are all set roughly to the same elevation, about 20 ft above water, regardless of height of towers. They are further stiffened by telescoping pipe knee braces that can be adjusted and held by heavy set screws to the desired length.

Of course, one tower and the corresponding two sets of yokes must be held out until the caisson is floated inside the tower assembly. Once the assembly has been completed, the caisson can be controlled by wedging against the tower leg rubbing channels.



SWINGING PIPE BOOMS for supporting chain hoists that raise wall forms are inserted in tops of caisson jet pipes—just another clever stunt on this remarkable job.

The tower structure has proved remarkably steady. It is so firm that the two big floating gantry cranes—one Clyde and one American—are anchored to the towers. These cranes drive the piles, erect the cofferdam, dredge out the wells with clamshells and hoist concrete in buckets from barges. The towers and yokes also make good working platforms. On such a platform at each caisson is placed a Worthington 500-ft compressor, a Kohler 5 kw light plant, and a Hobart welding machine.

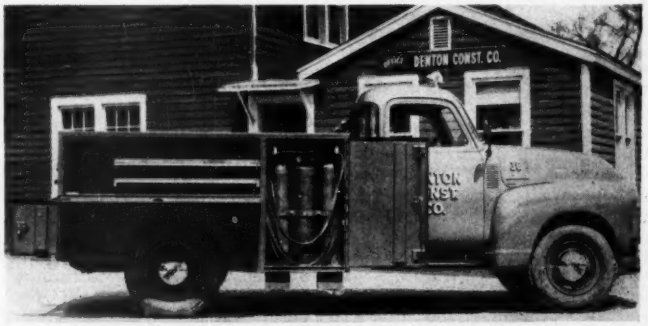
Ready-mix concrete is delivered dockside on the Yorktown shore for transportation in buckets by barge to the caissons. At each pier the buckets are hoisted to a hopper, thence the concrete is distributed to the forms by buggy. Concrete in the walls and diaphragms is poured in 9-ft lifts.

C. J. Mullen is chief engineer for the Virginia Department of Highways and W. R. Glidden is bridge engineer. Roger B. Stevenson is resident engineer for the consultants, Parsons, Brinckerhoff, Hall & Macdonald.

For the substructure contractor, Massman Construction Co. and Kansas City Bridge Co., George Adgate is project manager, John Kuhn is general superintendent, Joe Fletcher is superintendent and Tom Kinter is field engineer.

Contractor Designs Master Mechanic's Truck

TO PROPERLY SERVE his various roadbuilding outfits, usually scattered all over Michigan and nearby states, Leet Denton, of Denton Construction Co., Detroit, has designed a special master mechanic's truck. The body, built to Denton's specifications, is mounted on a GMC chassis. The heavy steel body is a deep open type, with three hinged-door cabinets on each side. Accompanying photo shows its features.



SMALL BUT TOUGH GAP in closure of Columbia River at McNary Dam is finally plugged with thousands of 12-ton precast tetrahedral concrete blocks amassed in foreground for last assault on river's flow. Blocks are dumped into gap by cableway set at angle across opening in cofferdam. As gap fills up, river discharge is diverted through slots in spillway structure against Washington shore, shown at upper right.—U.S. Corps of Engineers Photo.

CABLEWAY SKIP dumps 12-ton block into fast current in cofferdam gap to start closure of Columbia at McNary Dam. Skip handling both blocks and big rock is carried by double hoist line.—Otto R. Lunn Photo.

Precast Concrete Blocks Divert Columbia at McNary Dam

JUST ABOUT the toughest diversion job in all history of big dam construction was licked at McNary Dam on the Columbia River with a flock of 12-ton precast tetrahedral concrete blocks. Various stages of cofferdams have been nibbling at the river since the start of the job until finally only a 240-ft. gap was left through which a flow of 152,000 cfs was pouring where the channel was more than 60 ft. deep. Slots had been left in the Washington shore spillway section of the dam—but of course the gap had to be closed off to divert the flow through the slots—and it took six weeks to do it.

Looking far ahead, the Army Engineers in charge of the project had specified the final closure be made with 8-ton precast tetrahedral (equilateral pyramid) blocks as most likely to interlock and hold against the swift current, estimated at 35 mph. But McNary

Dam contractors figured if 8-ton blocks were good, then 12-ton blocks would be that much better. So they cast up 3,000 such blocks.

To cover the gap fully cableway was erected diagonally across the opening. An embankment to carry a traveling tailtower was built downstream from the end of the river arm of the cofferdam. Likewise, another embankment was built upstream from the outer end of the shore arm of the cofferdam to carry a traveling headtower. This cableway was fitted with a double hoist line to handle a skip whose dumping could be controlled.

3,000 Blocks on Hand

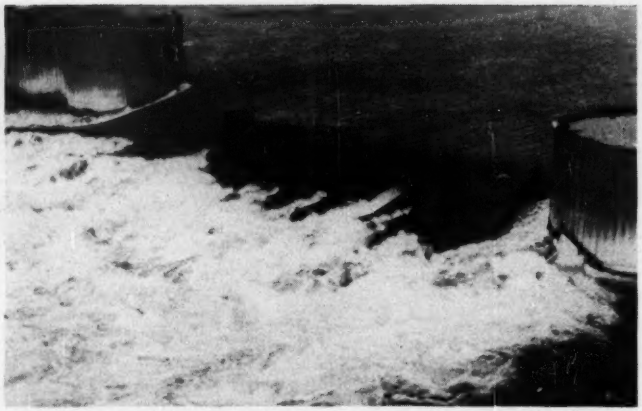
Prior to start of actual closure the 3,000 precast blocks were moved to a storage area close to the headtower. The headtower was also within reach of a road from the Oregon shore over which large rock could be trucked to the cableway.

Closure was finally made with 2,087 tetrahedral blocks and 27,000 tons of large rock of 1-ton minimum weight. Rock was dumped into areas where the current had slowed enough to indicate the individual pieces would stay put. Plugging the gap took about six weeks. River flow when operations started was only 100,000 cfs. Peak planned flow was 126,000 cfs, but actually the flow topped 152,000 cfs before the job was finished. The fact that the operation was successfully carried out despite the greatly increased river discharge shows that planning and execution of the operation were perfect.

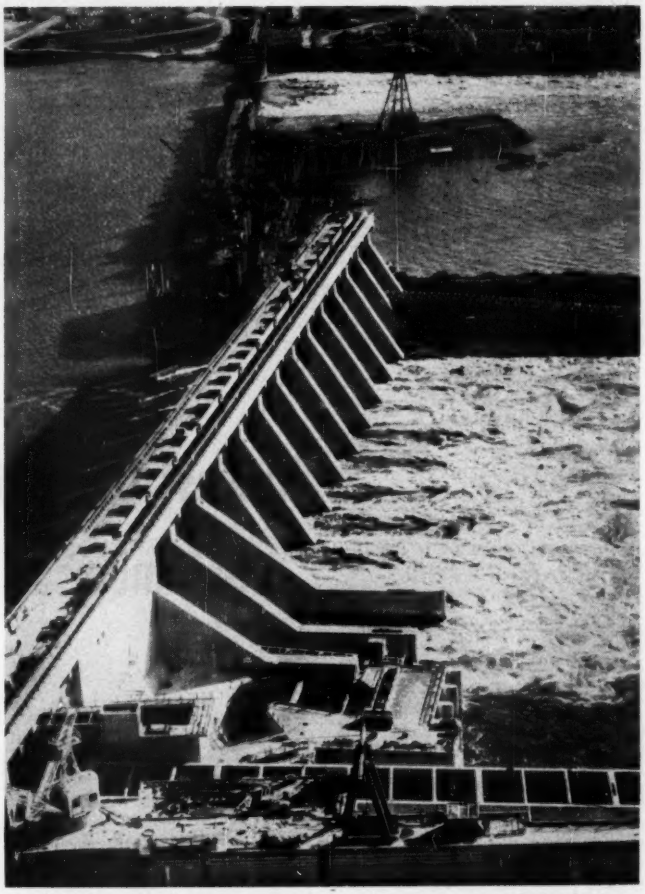
Timber Crib Tops Fill

After the combination of blocks and rock had diverted most of the flow, closure was finished by topping off to a predetermined level with smaller stone. Upon this base a rock-filled timber crib is being erected, containing an upstream fill of impervious material. Also, a rock blanket is being placed on the upstream face of the fill.

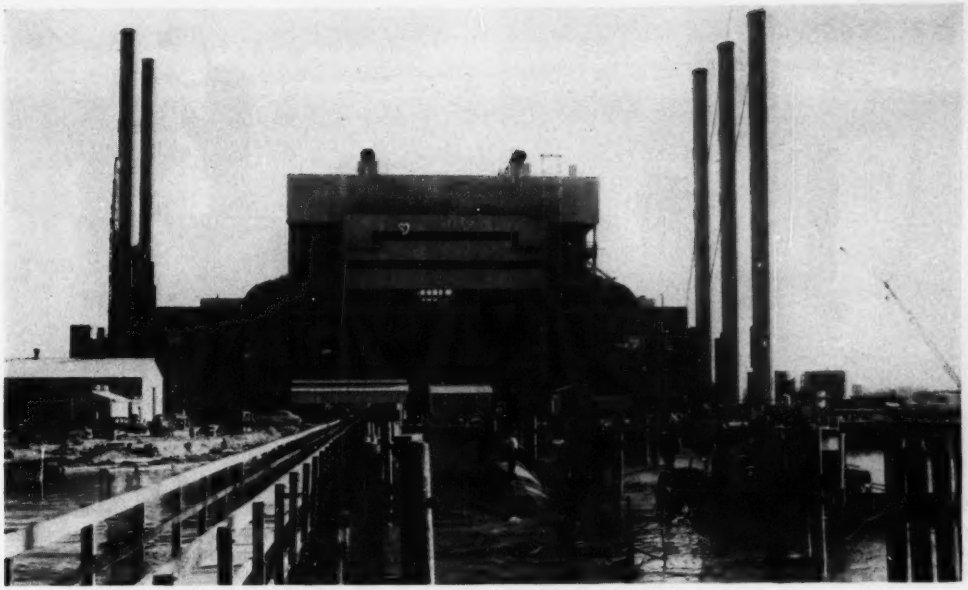
Guy F. Atkinson Co., J. A. Jones Construction Co. and Ostrander Construction Co. make up McNary Dam Contractors. R. J. Jenks is project manager. The dam is under the direction of Col. Wm. H. Mills, District Engineer, Walla Walla District, U. S. Corps of Engineers.



RIVER RISES through narrow gap in cofferdam as tetrahedral blocks are dumped into 60-ft deep channels. Some of blocks are swept downstream by rushing current; others are tossed aside as can be seen at cell at upper right. But enough blocks interlocked and held to plug the channel.—Otto R. Lunn Photo.



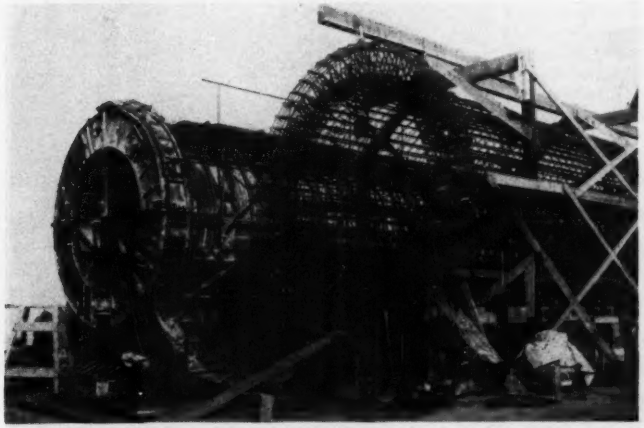
RIVER FLOW switches to slots in dam section in foreground as gap in cofferdam (upper center) is slowly plugged with concrete blocks and heavy rock.—Corps of Engineers Photo.



Conventional cofferdams and big tremie pours are eliminated as ...

Big Precast Tubes are Sunk For Power Plant Intake

THE JOB was to install two 14-ft dia tubes, each 400 ft long, for cooling water intake at Pacific Gas & Electric Co.'s new 300,000-kw Contra Costa steam plant on the Sacramento River near Antioch, Calif. After considerable study the contractor, Bechtel Corp. of San Francisco, discarded conventional construction methods, such as building in the dry inside of cofferdams or going to large tremie pours, in favor of precasting the tubes in 100-ft sections near the site, floating and sinking them in place, as much cheaper and faster.

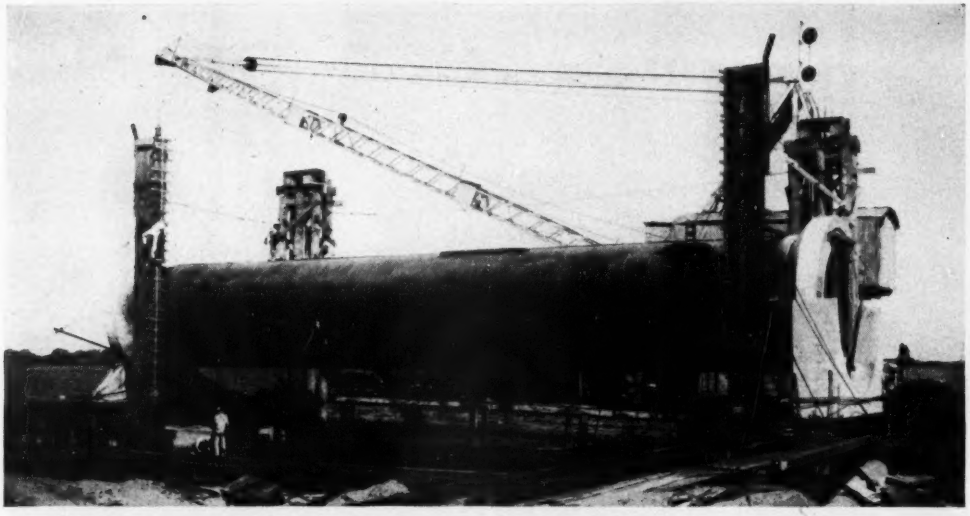


EACH 100-FT SECTION of intake tube, weighing 480 tons and containing 41 tons of reinforcing, is fabricated on land with steel forms. Tubes, 12 ft inside dia with 14-in. walls, are cast in continuous 4-hr monolithic pours.

Each of the heavily-reinforced 100-ft lengths weighs 480 tons. The pipe sections are similar to those fabricated by the Guy F. Atkinson Co. for Hyperion outfall sewer in Los Angeles (CONSTRUCTION METHODS AND EQUIPMENT, November 1948, page 36). In fact, Bechtel obtained the same set of steel forms for the intake job.

Construction procedure was divided into two parts: (1) Precasting the tube sections at a riverside yard 1,500 ft from the power plant, and rolling them into the water; (2) floating the tubes to final location, sinking them in place to close tolerances, joining the section and tremie casting concrete anchors to pile supports.

At the casting yard the tubes were fabricated with bell-and-spigot joints, but only the bottom half of each bell was cast in place —the upper half was tremie poured at the site as part of the pier anchorage. Each end of the tubes was closed off by a steel bulkhead

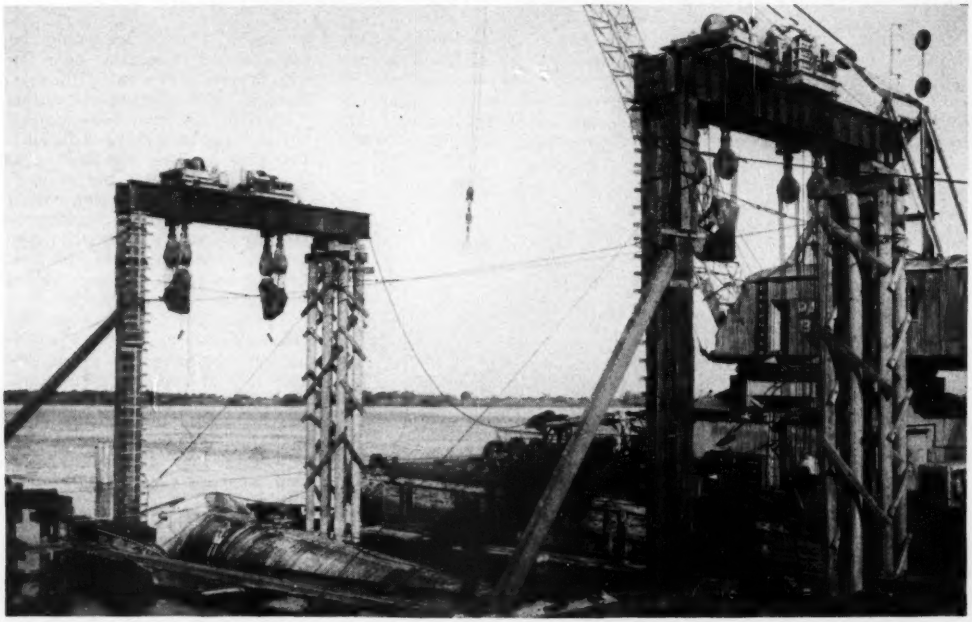


TUBE SECTIONS roll down ways on 4-ft lengths of extra heavy 4-in. pipe filled with concrete. Landward pair of dolphins are hinged to lay flat so tubes can roll over them into launching position as shown here. Floating derrick lifts hinged dolphins back to vertical position and then places lifting beams across tops of dolphins. Note that only lower half of ball joint is cast with tube section.

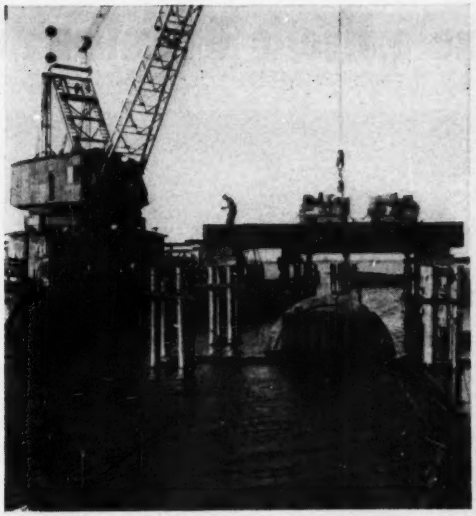
with rubber gasket for the trip down the river.

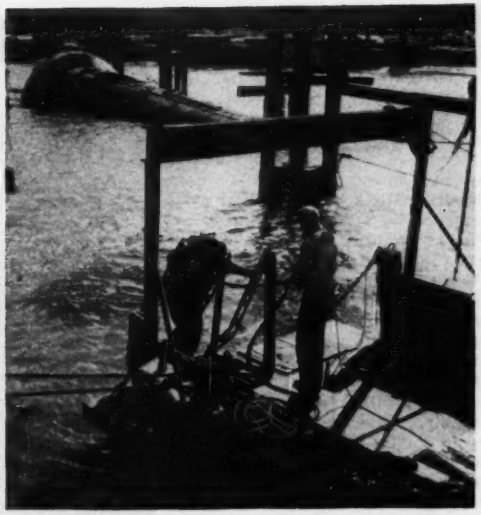
When ready for launching, the sections were jacked up for insertion of pipe rollers for moving to the river. At the river were four dolphins, two on land, hinged to let the tubes roll beyond over the water, and two offshore. When a tube had been rolled to end of track, the land dolphins were raised to vertical position and lifting beams were placed across the tops of dolphins. Electric winch gear on the lifting beams then lowered the sections into the water.

At the intake site arrangements were made for precision placement



SEALED TUBE SECTION has just been lowered from ways into water by pair of 20-hp electric winches on each lifting beam rigged up with 18-part $\frac{7}{8}$-in. line. Lifting slings at each end of tube are made up of $2\frac{1}{2}$-in. wire rope.

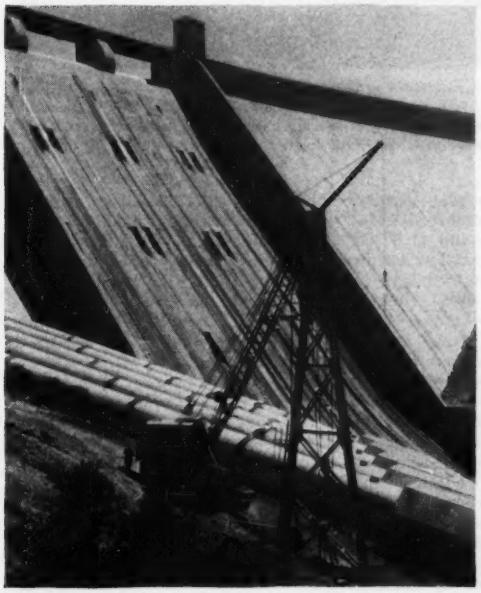




CREWS HOOK UP tube section to lifting beam hoist lines for final lowering to place (left). When tube is submerged and flooded, bulkhead is removed by divers. On last sections, riverward control gates and inspection facilities weighing about 40 tons are attached at fabrication yard and floated into place with pipe sections. Divers supervise pouring of tremie top seals between submerged sections (right). At same time, blocks for anchoring tubes to pile foundations are tremie poured.

of the tubes. Here pile dolphins were driven along the planned paths of the two tubes. A pair of lifting beams, each equipped with two electric winches, could be moved from one set of dolphins to another to spot each tube. The bulkheads were fitted with valves to flood the tubes for sinking. Bulkheads were removed by divers, who also guided the sections into final place. Then the joints were closed and the pile anchors were poured with tremie concrete.

Pacific Bridge Co. handled the moving under a $265,000 subcontract, with William Dippold as superintendent. Martin Akeyson was in charge of construction of the tubes for Bechtel. Ed Garbarini is general job superintendent.



Cableway Spans Shasta Spillway To Facilitate Repairs to Apron

SHASTA DAM has prepared for the worst. A cableway and cofferdam setup is ready to make repairs quickly and inexpensively if erosion should damage the spillway apron. Spanning 1,380 ft, the 30-ton cableway will place 1,000 tons of assembled steel cofferdam sections so the stilling basin can be pumped dry. It's insurance against costly repair bills.

Cableway head tower, 130 ft high, sits on the east (left) bank of the Sacremento River; a 60-ft tail tower (photo) is founded 162 ft below on the west. These A-frames support a 24-ton 3-in. locked coil main track cable 1,668 ft long. This was installed by a step-up method: First a ½-in. manila pilot rope was passed over, attached to a ½-in. wire rope; this, in turn, drew a 1¼-in. wire messenger line over which the 3-in. track cable was pulled. Permanent haul line is 1⅛ in.

Operating machinery, powered by 150-hp electric motor, is in a hoist house directly behind the head tower. Both friction and regenerative braking are available; load and haul drums are synchronized.

Washington Iron Works, Seattle, furnished the cableway, erected by John C. Gist Co., Sacramento. American Bridge Co. made the cofferdam sections, which are large trestle bents and bulkhead panels. The job was for Region II, U.S. Bureau of Reclamation, R.S. Calland, acting director.

Retesting Big Gas Pipeline a Hectic Operation

By JAMES M. CONNOLLY
Associate Editor

IN BUILDING UP the initial gas pressure in Transcontinental Gas Pipe Line Corp's. 30-in. natural gas pipeline from Texas to New York City, preparatory to putting the line in service, breaks occurred in the pipe in New Jersey and in eastern Pennsylvania. Mere repair of the breaks would have been a simple operation. But taking no chances with possible further trouble, Transco requested its agent for the line, Fish Constructors of Houston, Tex., to submit the pipeline to a severe hydrostatic pressure test for the stretch between New Brunswick, N. J., and the Potomac River. The line between New Brunswick and the Rahway River had been given a hydrostatic test, and the remaining section through the congested metropolitan area to New York City had been air tested.

Because every day the line was out of service meant a heavy loss of revenue to the owners, the retesting was put on a round-the-clock 7-day-week schedule—and naturally expense was a minor consideration. Engineering and pipeline crews were recalled in a hurry.

First, line profiles were studied for elevation changes that marked off natural test sections—and these ran from 11 mi to 40 mi each. Then water supplies had to be located to furnish the tremendous amount of water needed for testing, about 200,000 gal per mi.

CENTER OF ACTIVITY for northernmost hydrostatic test on 30-in. natural gas pipeline was in New Brunswick, N. J. From here line ran 11 mi north, 15 mi south. Pipe was exposed, 10-ft piece removed, rubber squeegees inserted, ends capped and two 8-in. induction lines welded in place, complete with valves. Water for test was drawn by . . .

Wanted: Equipment

Immediate calls went out for flocks of high-capacity pumps to fill the sections and boost the hydraulic pressure up to 250 psi, and for batteries of portable air compressors to later blow the water out of the line and dry up the pipe. The equipment distributors in the area did a grand job in rounding up this machinery on short notice, even to flying a foot valve in from Chicago.

A truck-mounted high-pressure Halliburton oil field pump—necessary to kick the hydrostatic pressure up to that required—was located in Ohio and was on its way to New Jersey within the hour. How this outfit battled its way through the Ohio and Pennsylvania blizzards when all other traffic was snowbound is a saga in itself. Once it was slowed down to 35 mi progress in two days, but the big 6x6 former army truck finally got through. Another Halliburton pump rig came in from Oklahoma to round out a second complete pump-compressor outfit.

A host of other items had to be assembled in a hurry, such as tractor cranes, excavators, light plants, welding machines and gear, new 30-in. pipe lengths, small pipe, valves and gages.

Then the rains came in New Jersey and snow fell in Pennsylvania and Maryland, sending streams into flood stages that drowned out pumping stations. Two ripping hurricanes brought more miserable weather. All in all, the elements seemed to conspire to make the job conditions the worst possible.

Once the test sections were determined, pipeline crews were dispatched to their end points to uncover the pipe with backhoes and small clamshells. Then a 10-ft section of pipe was cut out, and the ends of the pipe were fitted with weld caps. Also, the crews uncovered and removed all mainline valves, averaging 18 mi apart, replacing the valve sections with continuous straight pipe. Meanwhile, of course, the original breaks had been repaired.

With the line now broken up in-

. . . FOUR HIGH-SPEED PUMPS on Millstone River bank, tied through Y connections (above). Combined volume of 300,000 gph filled 15-mi section in 10 hr, pushing squeegee ahead and driving out remaining gas left when line blew. All night long torrential rains continued, drowning out pumps which were disconnected and hauled to higher ground.

to test lengths from 11 to 40 mi each, the strategy was to place pump outfits and compressor plants at alternate break points so each outfit could work two sections from alternate stations, overlapping in each direction.

The typical test procedure is best illustrated by the following description of activities at one point—near New Brunswick, N. J., where the line was broken for an 11-mi test section north and a 15-mi section south. This point is at the crossing of the Millstone River, where a county road parallels the river, so center of operations was established midway in the 150-ft space between road and stream.

Before the caps were welded on to the test sections, a heavy rubber-gasketed pipe squeegee or go-devil —known to pipeliners as a pig— was inserted in each of the open ends and shoved 10 ft into the pipe, one headed north, the other headed south. The caps were then welded in place and two 8-in. induction pipes, 8 ft long, were cut into and welded to the top of the 30-in. main about 6 ft from the cap. An 8-in. valve was fastened to the end of each induction pipe, topped with a flange connection. From each of these connections led an 8-in. Y manifold to accommodate two pumps each, or four all told. A 4-in. upright discharge stub, fitted with shut-off valve, was tied into the main pipe 10 ft from the farther end cap to complete the piping layout.

The four pumps at this station totalled 300,000-gal-per-hr capacity. They were: three Peerless pumps powered by a GM twin diesel, BFM twin diesel, and Waukesha gas engine, respectively, and a Gould pump connected to a Hercules engine. The GM rig is rated at 1,400 gpm, the other three at 1,200 gpm each, a total of 5,000 gpm.

Final checks were made and reported over Fish Constructors' two-way radio hookup. Then, at a signal, all four pumps, hooked into the south test section only, roared into action, drawing their supply from the river. As water was pumped into the line, the pig moved ahead at the rate of 1½ mph, pushing all the gas which was still present out through the 4-in. vent at the opposite end.

The pig arrived at the end of its 15-mi journey 10 hr later, its arrival announced by a column of water spurting up through the 4-in. vent. The vent valve was slowly closed, transmitting the water pressure back to the pig which slammed home into the capped end of the main pipe as the bleeder tube let out all remaining air.

Getting Up Pressure

The pumps began to whine as the pressure climbed above 200 psi, and were stopped just under 250 lb. Meanwhile the truck-mounted high-pressure pumping unit had been brought in and set up alongside the ditch—a rig designed and operated by the Halliburton Oil Well Cementing Co. of Duncan, Okla. Valves were closed, one of the induction lines was removed and connected through an 8-to-2-in. swage to the 2-in. discharge pipe on the Halliburton rig. A 3-in. suction line was tapped into the line running up from one of the big pumps which in turn was idled down considerably to serve merely as a feed to the high-pressure pump. Slowly but surely the two-stage pump—driven directly by the truck motor—boosted the pressure to the desired 960 psi for this particular section in slightly more than 3 hr. This pressure was held for 5 min, then dropped back 100 lb to 860 lb—then up to 960 lb again for a second surge, where it was held for 2 hr, with no drop allowed. And no drop resulted.

As pressure kept mounting, all eyes were focused on a dead weight tester which showed increases to

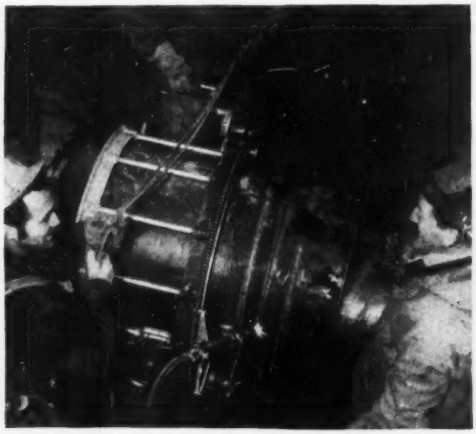
MOBILE HALLIBURTON OIL-WELL PUMP took over at 250 psi and slowly boosted pressure to 960 psi in 3 hr. One induction line was replaced by 8-to-2-in. swage and connected to truck discharge line. Valve on remaining 8-in. line was closed. Pressure was dropped back to 860 psi on this section, then surged up to 960 psi again, held 2 hr.

DEAD-WEIGHT TESTER, connected to bleeder tube in capped end showed pressure increases. Here Jim Blakemore checks initial 200 psi reading. He is chief inspector for Fish Constructors, Inc. of Houston, Tex., agents on pipeline for Transcontinental Gas Pipe Line Corp., and in charge of New Jersey tests. To release pressure from line, induction pipe was cut and lashed to sideboom tractor to prevent whipping.

a fraction of a pound. The tester consists of a ⅛-in. tube filled with lightweight oil and fastened to the ½-in. bleeder tube in the pipe cap. The tube ran up to a small oil reservoir with a screw cap and then into the bottom of a plunger barrel. Brass weights were placed on the plunger cap, marked to match the psi pressure. A check was kept in 100-lb increments, and as the water pressure rose in the pipe and passed the 300-psi mark the oil lifted the plunger and three 100-lb counter balances. Another weight was added, forcing the oil back again. Thus the procedure continued to the 900 psi mark, when 20-lb weights were used. A bird's-eye water level assured that the testing table was level and that the plunger was vertical throughout the test.

Return Trip

As soon as the Halliburton rig began pumping, the 8-in. line it replaced was fastened to the north section to begin the filling operation. When the time came to release the pressure from the south line, the remaining 8-in. intake line was cut just ahead of the Y connection. An extra section was welded on to carry the end to the river, and this end was lashed to an HD-19 side-boom tractor "to keep it from snapping around like a bull-whip." This pressure-releasing stage caused quite a bit of concern since no extra heavy tube turns had been available and job-made mitered turns were hurriedly cut, welded up, and fastened to



AT FARTHER END of each section, cap was removed, squeegee pulled out and reversed (right), and cap welded on again. This time a battery of compressors, totaling 3,000 cfm, pushed pig (pipeliner's term for squeegee) back again, removing water from line.

Rotary guide (left) insured perfectly square cut with torch. First cut is perpendicular, second at angle of 35 deg to insure strong weld. Note marks from former cuts and welds on either side of current torch cut. Meanwhile manifold and cap are held by winch.

the main pipe. Fears were quickly allayed, however, because the mitered right-angle joints not only withstood the tremendous pressure and volume of the releasing, but were also used for subsequent filling and emptying operations.

When the pressure was let out of the line, the farther cap was removed; the pig pulled out, reversed and pushed beyond the vent, and the cap was replaced. An 8-in. manifold was welded to the pipe in place of the 4-in. vent, and hooked up to a battery of air compressors totaling 3,000 cfm which pushed the pig along on its return trip, forcing out the water ahead of it. This compressor outfit consisted of one LeRoi 315, two LeRoi 600's, two Worthington and one Gardner-Denver, all 500's.

Final Cleanout

Allowing 10 lb of air pressure to move the pig, plus 25 lb for the static head and an additional 20 to 25 lb for friction head, the air pressure built up enough to push the squeegee back to where it came from at the rate of 1 mi per hr. Therefore, the pipe was empty 15 hr later. The pig was removed, transported to the compressor end and started through once more. After it had proceeded 1 mi, a follow-up squeegee was put in and the two, with no water resistance this time, fairly flew through the tube. The first pig cleaned out the few gallons of water remaining in the line and the follower came out dry. If it, too, had pushed water, more pigs would be sent through until one came out dry.

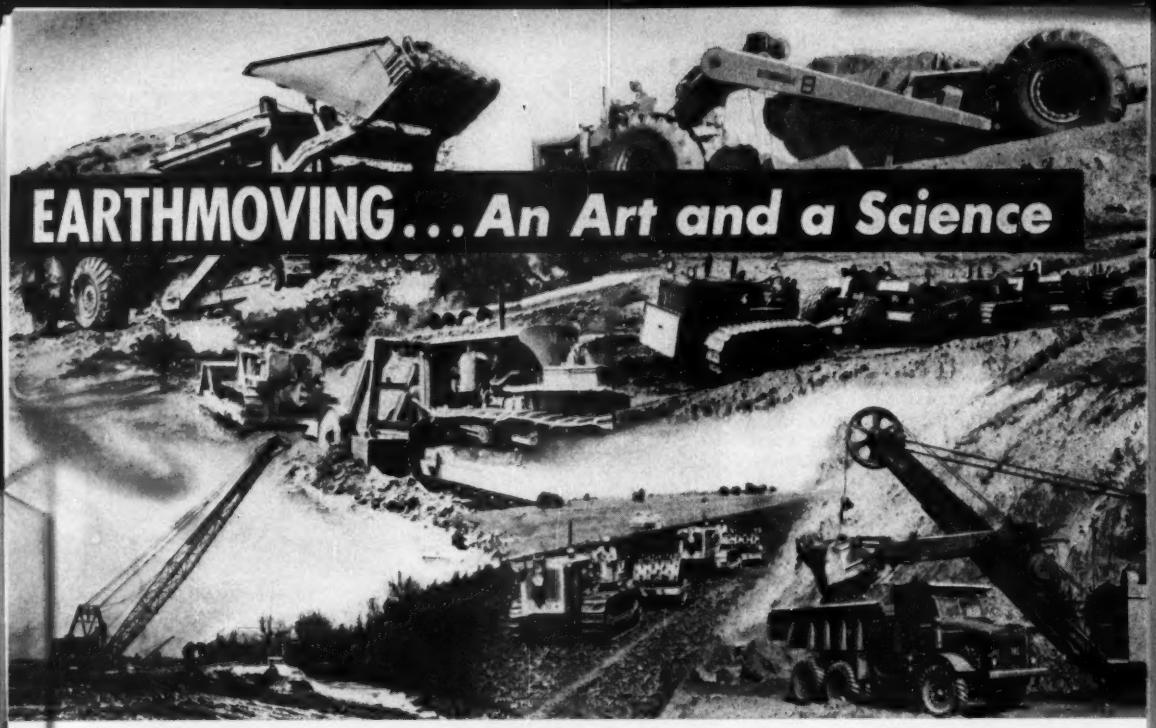
In similar manner the north half was tested, uneventfully, and then the crews moved down the line. Longest test was a 40-mi run from the Schuylkill River to the Delaware River, involving some 8,000,000 gal of water. Another problem, incidentally, was the obligation to return all test waters to their sources.

Personnel

R. S. Bruns Jr. is vice-president for the Transcontinental Gas Pipe Line Corp.—known to the trade as Transco—with local offices in Newark, N. J. Ken Biederman is division superintendent for Fish Constructors, assisted by Loyd Harleston. Immediate supervision of the New Jersey tests fell to Jim Blakemore and B. J. Dougherty, Fish's chief inspector and schedule engineer.

NORTHERN TERMINUS of hydrostatic tests was at valve location in New Brunswick. Similar valves, located 18 mi apart, were removed where they occurred in straight test runs, to allow squeegees to pass. Note bleeder stubs which extend above ground level on either side of valve to allow cleanout of line whenever necessary.

END PIECE IS CLAMPED to line and held securely for welding. Similar tests were held simultaneously all the way back to Potomac River. Longest stretch was 40-mi run between Schuylkill and Delaware Rivers, requiring 8,000,000 gal of water for test. High pressures varied on each section, depending upon heads.



EARTHMOVING... An Art and a Science

1. History and Job Analysis

BY DAN K. HEIPLE

Chief Field Engineer,
R. G. LeTourneau, Inc., Peoria, Ill.

SINCE HIS BEGINNING, man has been dissatisfied with the lay of the land. First he moved it by hand to make himself a hole in the ground or hillside to provide shelter and protection.

The earliest Egyptians carried out construction and repairs of public edifices and roads. With great labor forces they built irrigation ditches, canals, and roads as well as pyramids. Earthmoving methods were simple and without completion dates. With abundance of labor, the material was excavated by hand and transported in baskets.

Early American Indians moved thousands and thousands of cubic yards of earth by the hand-and-basket method in the construction of burial mounds which may still be seen along the Mississippi and Ohio River Valleys. In some parts of the world, people still use these primitive methods.

From early pioneer days to the Civil War, the common hand shovel and wheelbarrow were the only reliable earthmoving tools. The plow as an earthmoving tool was introduced by Metcalf and Telford in about 1819 when they started to construct roads in England and Scotland. It was used to loose the earth to expedite its removal. In those days, and probably many years prior, the importance of compaction was recognized. Cattle and sheep were used as compaction tools, being driven back and forth across the fills to get compaction.

As the railroads developed, with flat grades required for their operation, new demands were placed on earthmoving. Equipment consisted chiefly of teams and wagons and hand loading devices, so construction progress was generally slow. It should be noted, however, that big jobs could be and were pushed through in time schedules that are staggering even with present-day methods.

For instance, beginning in April, 1887, and finishing in October, Winston Bros. and D. C. Sheppard of St. Paul are reported to have graded, laid the track, and completed all bridges and culverts from Minot, N. D., to Great Falls, Mont.; a distance of 545 mi. for the Great Northern R. R. Some 10,000,000 cu yd were moved in grading the right-of-way. This is a record to shoot at even today. The difference comes in the manpower used. The average grading force on this job consisted of about 8,000 men and 3,300 teams.

The steam shovel was the first of modern tools used to excavate large quantities of earth; hauling being accomplished by wagons and teams or by railroads.

With the settlement of fertile river valleys in the United States, levees were required to protect the valuable bottom land. Some of the first levees were erected during General Robert E. Lee's days as an Army Engineer. Teams of horses with small slip scrapers built most of these small levees.

The coming of the gasoline engine and the automobile increased earthmoving requirements to the greatest in modern history. However not until the gasoline crawler tractor was invented by Holt and Best (later to become Caterpillar) were earthmoving methods changed. With powerful engines that would travel off roadways, up and down hills, and pull large

This is the first of a series of articles on the fundamental principles of earthmoving which will be published each month throughout most of the year. The entire field of earthmoving will be covered, including equipment selection, application and maintenance, operating costs, production factors, compaction, job engineering and other items. Various types of equipment will be discussed in turn.

Early chapters have been prepared by Dan K. Heiple, Chief Field Engineer for R. G. LeTourneau, Inc. Some chapters will be written by other authorities in the field, some will be prepared by our editorial staff.

Perhaps the old dirtmover may find some of the material somewhat elemental, but the idea behind this series is to present in one package a complete treatise of the subject of earthmoving. These articles are intended to serve as a practical reference guide for those who are interested in, or whose duties require, that the lay of the land as established by nature be changed to conform to the ideas and ambitions of men. —THE EDITOR

loads of earth, larger and larger projects were planned.

R. G. LeTourneau recognized the potentialities of the tractor as an earthmoving device. He developed a bulldozer to dig and push the dirt and a scraper that would dig, load, and discharge its load. These have been developed into self-propelled equipment that will haul loads of 60 tons at speeds up to 40 mph.

As new equipment is introduced, the earthmoving picture rapidly changes and the techniques and performances of construction change to get the maximum from this equipment.

Earthmoving jobs such as the 75,000,000-yd Garrison Dam, the 10,000,000-yd San Francisco International Airport and the 17,000,000 cu yd at Cherry Creek Dam are but a few examples of man's current ability to realize his ambitions in changing the face of the earth.

Job Analysis

Whether it is a road, air field, or removal of overburden for strip mining, a careful consideration of the factors involved is of prime importance if the contractor is to fulfill the terms of his contract at a profit. Failure to consider or rightly estimate the relative cost and importance of any factor may well mean the difference between his success and failure on the contract. Here, outlined briefly, are the important points in analyzing any job. No attempt has been made to assign an order of importance, as each will vary in turn with job conditions.

1. Accessibility, Transportation

With big, heavy earth-moving equipment, it is necessary to know what must be done to move this equipment from its present location to the new job.

On short moves, the fastest and least expensive method of transportation would seem to be for it to move from job to job under its own power. However, heavy-duty trailers or railroads are necessary to transport slow-moving equipment in an economical amount of time. These methods provide the required speed but involve the extra cost of providing and loading of trailer units.

Accessibility of the project site imposes may limitations. In some cases it may be necessary to build pioneer roads, supply housing and commissary, set up service facilities for parts, machine shop facilities and supply fuel.

2. Vegetation

Usually before dirt moving can begin, it will be necessary to clear the area of trees, stumps, boulders and brush. It is essential to know to what extent each exists and then estimate the time and auxiliary equipment needed. Occasionally, root structures may be so tough and complex as to require additional preparatory work by way of rooting.

In preparing an estimate, ascertain the specific requirements to open up the project for work, remembering that into every yard moved goes the cost of preliminary clearing.

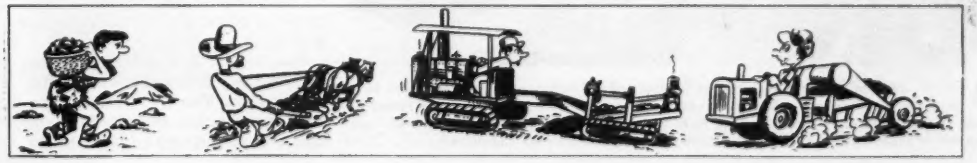
3. Quantities, Materials, Volume Changes

Basically, earthmoving is a leveling process; wasting a surplus, making up a deficiency, or a combination of the two. The ideal job would be, of course, a perfectly balanced cut and fill. However, topsoil, rich in humus, rarely meets fill specifications and must be wasted. And when fill quantities run high, borrow areas must be used.

The contractor's interest is focused on the "pay yard," whether in place on the cut or the fill, and how many of these pay yards he can crowd into his scraper or hauling unit in an economical loading time.

He must know over-all job quantities and place of measurement—cut or fill—but of equal significance is the characteristic of material.

(Continued on page 98)



Pipeline Pushed Across Minnesota Muskeg

1 FIRST STEP in pushing Canada-Lake Superior oil pipeline across muskeg in northern Minnesota is to weld pipe sections into long lengths. Pipe will lay on top of swamp mat, so is specially protected by extra wrapping around upper two-thirds of circumference—All photos from International Harvester Co.

WAY UP in northern Minnesota a Texas contractor, Anderson Bros. of Houston, had to figure out some way to lay their section of 22-in. oil pipeline from Edmonton to Superior across stretches of impassable muskeg. The bogs, covered with a heavy vegetal mat, would support a man for hand clearing operations, but wouldn't carry any equipment for ditching or pipelaying.

But Anderson figured out a simple way to lay the pipe over the swamps—they just welded up pipe lengths into sections up to 800 ft long and shoved them across the bogs with two International TD24 tractors equipped with Superior pipe booms. A guide nose was welded on to the leading end of the front section.

2 FIRST SECTION, fitted with protecting guide nose, is walked into swamp area by two TD24 sideboom tractors. Corduroy road at left permits lead tractor to travel short distance into edge of bog. Trench is for later transition from buried pipe to that on muskeg surface.

3 FRONT END of first section has been landed well out into swamp. Tractors come back for a second hitch and walk pipe ahead for another shove. Pipe sections are added at rear as pipe progresses across muskeg. Note that special wrapping has been omitted from bottom of pipe; otherwise it would be torn off as line slides across swamp mat.

The two tractors, traveling on firm ground at the edge of the swamp, walked the pipe ahead. New sections were added to build up a continuous pipeline between walking operations. Bogs as wide as 2,000 ft were crossed in this manner.

No attempt was made to place the pipe in trench, for a ditch in muskeg would be bottomless and could not support the line. Instead, the pipe was left exposed, riding on the vegetal mat. The accompanying pictures show how the job was done.

Ralph Hitz was spread foreman on the Deer River section for Anderson Bros. The 1,150-mi oil pipeline from Canada to Lake Superior was completed late in November.

New tractor packs more punch for its size—with help of 54 TIMKEN® bearings!

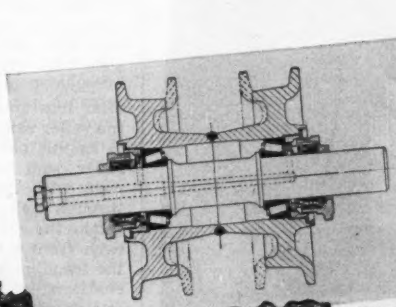
BIG news for tractor users is this Allis-Chalmers HD-15 tractor, shown below loading a Gar Wood scraper. New from the ground up, it provides more weight and power than previously considered standard for its class.

To insure smooth, dependable operation with minimum maintenance, under the toughest loads, Allis-Chalmers mounts vital parts of the HD-15 on Timken® tapered roller bearings. A total of 54 Timken bearings are used.

Timken bearings prevent wear on moving parts by holding gears and shafts in proper alignment. They take both radial and thrust loads in any combination, eliminating the need for special thrust bearings and making possible a more simplified, rugged design. Because of the line contact between Timken bearing rollers and races, Timken bearings provide extra load capacity—carry the heaviest loads safely. And Timken bearings permit the use of tighter closures which retain lubricant, keep dirt out.

The rolls and races of Timken bearings are made of Timken fine alloy steel, case-hardened to give a hard, wear-resistant surface and a tough, shock-resistant inner core. Normally, Timken bearings last the life of the machine in which they are used. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **ALLIS-CHALMERS** *mounts truck wheel assembly of new HD-15 tractor on Timken bearings. A total of 54 Timken bearings are used in the HD-15, as follows: bevel gear and clutch shaft, final drive pinion shaft, final drive intermediate shaft, final drive sprocket shaft, track idlers, track support rollers, truck wheels, power take-off pinion shaft, power take-off gear shaft. And the Gar Wood scraper shown below is also Timken bearing equipped.*

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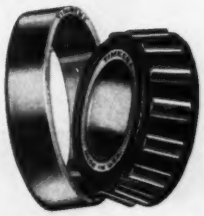

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Legal Decisions Concerning Construction

When the Contractor Lies

"I OWN real estate worth $10,000 clear of all claims, my personal property's worth $10,000 more and I've got $5,000 in the bank," the contractor avers.

"Then your credit must be all right," the seller agrees, sells the contractor $5,000 worth of goods on credit and calls up the "Building Protection Bureau."

"The party that you name goes through bankruptcy as often as the law will permit and isn't worth $500," the Bureau tells him.

"Now I wonder if I can get after him and retake my goods?" the seller asks himself.

On this point the law is that a seller who has been induced to part with his goods on credit through the fraud of the buyer may retake the goods from the buyer or even from a buyer with notice of the fraud, or from the first buyer's creditors.

A New York case laying down this rule is Hennequin vs Naylor, 24 N. Y. 139, and there are Alabama, California, Colorado, Connecticut, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Lousiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Hampshire, New Jersey, North Carolina, Ohio, Pennsylvania, Texas, Utah, Vermont and Wisconsin decisions to the same effect.

The Contractor Repudiates

THE WHOLESALER has sold a contractor a carload of material, and the latter was far from satisfied.

"That stuff you sold me wasn't as you represented, and you've got to take it back," the contractor averred.

"I'll do nothing of the sort," the wholesaler retorted. "I'll sue you for the price of the goods and prove that there was no misrepresentation."

"Well, here's the key to the warehouse where it's stored, and you can go and get it any time you like."

"Put your key in your pocket,"

the wholesaler ordered, and the contractor departed.

"You'd better have taken the stuff," the bookkeeper declared. "I heard down town about ten minutes ago that the fellow's right on the verge of bankruptcy."

"Wish I'd known that before."

"He's talking to the policeman across the street now," the bookkeeper stated, and the wholesaler hustled over to the curb.

"I'll call the sale off, and take back the goods as you proposed," the wholesaler offered.

"Nothing doing—I offered it to you once, and I never give a second chance," the contractor retorted. The wholesaler sued for the value of the goods, and the contractor proved that he had tendered it back, but that his tender had been refused.

"I offered to take the goods ten minutes later, and my offer was turned down," the wholesaler proved in reply, and the Alabama Supreme Court ruled in his favor in the case of Bennett vs. Fail, 26 Ala, 605.

Stoppage in Transit

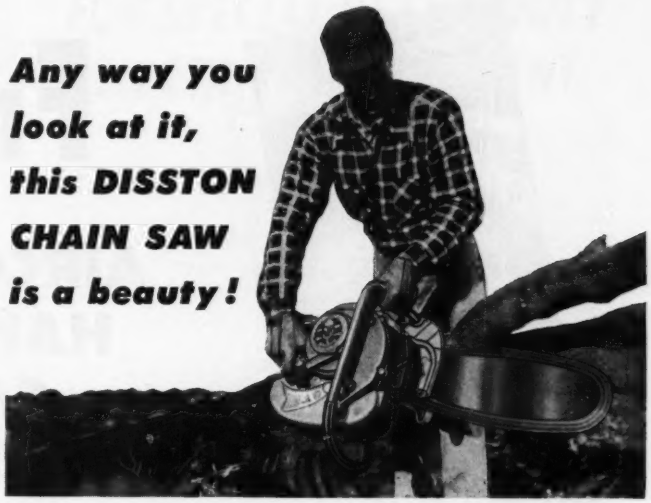
IF A SELLER ships goods to a contractor, to be paid for on arrival, and then the seller learns that the contractor is hopelessly insolvent, he may stop the goods and have them returned as long as the goods remain in the possession of the railway company, under what is known as the rights of "stoppage in transit."

"That's a business commonplace that every business man knows," the reader may conclude, but suppose that the insolvent contractor agrees to pay for the goods 30 days after arrival, and the seller attempts to stop the shipment in transit before the 30 days have expired.

"You sold the goods on credit, there is no legal presumption that I will not be able to pay when the proper time arrives, and you can't legally exercise your right of stoppage in transit until the period of credit has expired," the contractor's lawyer contended.

This point has been before the American Courts in a number of cases and the general rule which has been laid down is that the seller may exercise his right whether the goods have been sold on credit or not. One case in which this rule was laid down is Clapp vs Sohmer, 55 Iowa 273, and there are Maine, Massachusetts,

(Continued on page 63)



That's the way the DO-100 works, too—right side up, upside down, on either side, at any angle.

Compact, lightweight, yet that Mercury engine packs a lot of power—enough to do practically any cutting job. Bucking? Limbing? Felling? Rough terrain? This is the saw for you. The side-mounted rail allows close-to-the-ground cutting. Hefts easy, too.

Have heavy work to do? The DO-100 30" Light Convertible can do it! The balance that makes this unit a pleasure to carry makes it a pleasure to work with. Handles easily for one-man operation—is tough enough, when you add a helper handle, for two-man operation.

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converts to a 15" pulpwood-cutter's bow saw in a matter of minutes

or a tough 24" or 30" two-man saw that lets you handle the big ones

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REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL
Divisions of Air Reduction Company, Incorporated
Offices in Principal Cities

(Continued from page 61)

Missouri, Nebraska, New Hampshire, Ohio, and Wisconsin decisions to the same effect.

"Who Could Sue?"

THE CONTRACTOR had built a brick building on the corner of Main Street and Second Avenue worth $15,000, invested $5,000 of his own money, gave a mortgage to the Popular Loan Company to secure the balance of $10,000 and was using the ground floor for his head office.

One fine day in September, a sedan car, driven by a prominent citizen, ran wild and drove the hood thereof through the contractor's front window.

"I'll repair the damages and send you a bill of the actual coast, and I'll also expect you to pay damages for injury to my business," the contractor suggested.

"You'll get nothing out of me," the prominent citizen assured him.

"I'll sue you for damages."

"That's just what you can't do."

"I'm a free American citizen, and it's certainly news to me that I can't sue for damages to my own building, if I've got the money to pay a lawyer."

"It isn't your building — the Investment Company holds the mortgage. They are the only people who can sue, and as I'm vice-president of the Company, I don't think I'll sue myself very quick," the prominent citizen maintained.

The contractor did not accept this dictum as final, however, and sued for damages. He collected in full, as the American Courts have laid down the rule that the mortgagor of real estate in possession is regarded as the owner, and has, as against third persons, an undisputed right to sue for damages to the mortgaged property.

"Except as against the mortgagee, the mortgagor while in possession and before foreclosure is regarded as the real owner and a freeholder with the civil and political rights to that character; whereas the mortgagee, notwithstanding the form of the conveyance, has only a chattel interest, and his mortgage is a mere security for his debt," says the Vermont Supreme Court in the leading case of Van Dyke vs Grand Trunk R. Co. reported in 84 Vt. 212, and the rule has been laid down by the Alabama, Connecticut, Illinois, Maine, Maryland, Massachusetts, New Jersey, New Hampshire, New York and Pennsylvania Courts.

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Vibration now is recognized as the most efficient and most economical method of placing concrete. It permits use of a materials-saving harsher mix. It results in a most homogeneous distribution, potently bonded to reinforcing steel and at joints. And it reduces labor costs up to 60%.

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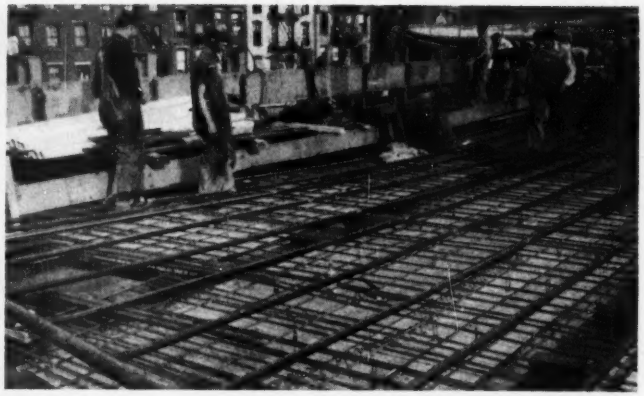


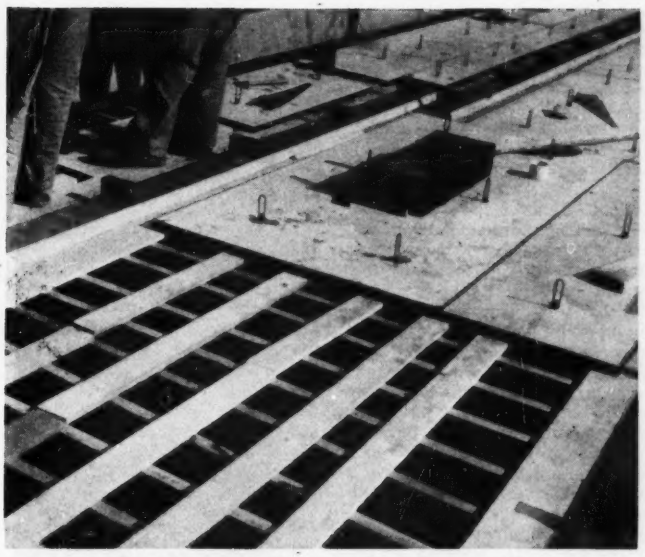
Maze of welded tubes buried in concrete pavement makes up . . .

11 Miles of Snow-Melting Pipe in Bus Ramps

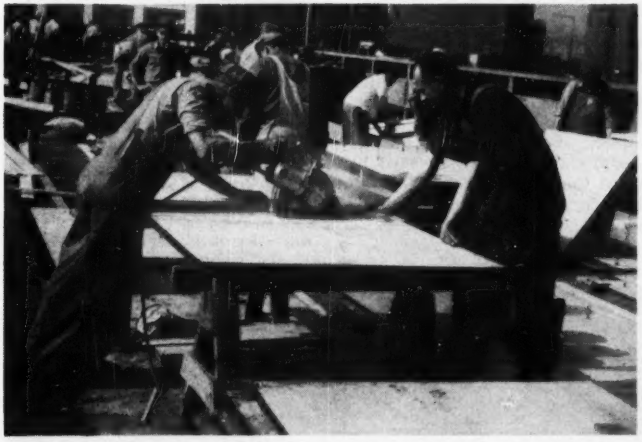
VIEW UP SNAKING RAMPS from Lincoln Tunnel entrance shows scattered activity involved in placing insulated decking, reinforcing, snow-melting pipes and concrete paving for direct connections to New York's Port Authority Bus Terminal (arrow).

HERE'S A NOVEL pipe line—this time in elevated ramps—to keep ice and snow off the approaches to New York City's Port Authority Bus Terminal. (CONSTRUCTION METHODS AND EQUIPMENT, Sept. 1950, page 47). Double 1,500-ft sinuous ramps connect the building directly with portals of the Lincoln Tunnel and contain some 55,000 ft of snow-melting piping. Through this maze—almost 11 mi long—will flow 11,000 gal of Sovaloid S, a non-corrosive anti-freeze made by Socony-Vacuum Oil Co. A central heating and pumping unit in the terminal circulates the liquid at 175 deg during snowstorms or periods when ice is apt to form, estimated to be about 200 hr each year. The system is expected to melt snow at the rate of 1 in. per hr.

Despite the network of piping and the ticklish job of placing an insulated deck under the concrete pours, Corbetta Construction Co.,



TRANSVERSE STRINGERS support 1x4 battens which are spaced 12 to 14 in. on centers, and placed to miss galvanized Tyloop bolts and support butted edges of Transitop insulation. Tyloops hold decking up firmly to prevent future heat loss through underside of slab.



SPECIAL CARBOLOY STEEL on saw teeth has no respect for asbestos sheets which sandwich wood fiber insulation. Teeth were built up 1/16 in. on each side to prevent binding, one blade and one Skilsaw doing entire job with no sign of wear.

New York, contractors for paving the ramps, completed pouring the 70,000 sq ft of 9-in. slab in a little less than 4 weeks. They sublet the pipe placing to Heating Maintenance Corp. of N. Y., and here's the cycle of operation:

First 3x4 posts and 2x6 runners were wedged off the bottom flange of the longitudinal girders to support 2x6 stringers on 1-ft centers. Where width of the bays exceeded 8 ft on curves, stringers were brought in to 6- and 8-in. centers instead of shoring up from the ground below. Meanwhile 4x8-ft sheets of Johns-Manville Transitop insulation board were fitted with Richmond Tyloops six to a panel. These loops projected up into the pour and were fastened with galvanized bolts. Transitop consists of two ⅛-in. sheets of asbestos board sandwiching a 1-in. center of wood fiber insulation impregnated with

(Continued on page 66)

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(Continued from page 65)

asphalt. This prevents any heat loss through the bottom of the slab and does away with the need of rubbing or pointing the underside of the concrete. A double layer of Koppers Bitumastic was painted on all exposed edges, and special care and handling prevented cracks or broken corners.

On top of the stringers, 1x4 battens were nailed 12 to 14 in. on centers, spaced to miss the Tyloop bolts and run under each longitudinal butt joint between sheets.

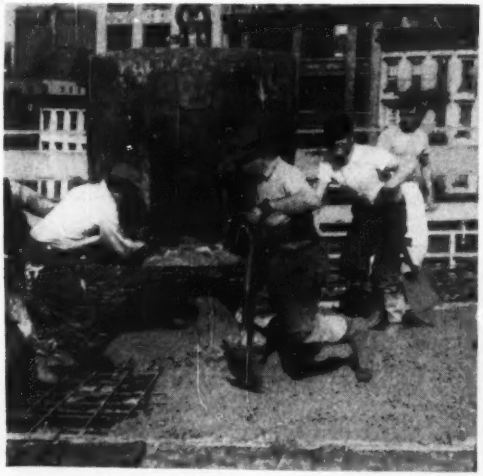
Spacing between board edges and top flanges of steel varied from 3 to 6 in. Wooden skewbacks placed against the beam flanges kept all underside steel exposed and the concrete butts up against the outer sides of the insulation board to protect it from dampness. Cutting Transitop was anticipated as a hopeless job with an ordinary blade, so the Corbetta Co. got a special Carboloy steel tooth blade from the Lafayette Saw Blade Co. in Brooklyn which ran through the stuff as if it were cheese. The cutting face of each tooth was built up 1/16 in. on each side to prevent binding, and a single Skilsaw and blade handled the entire job with no signs of wear.

Entire sections of sinuous tubing, headers, and runouts were prefabricated in the piping contractor's shop and assembled on lower reinforcing steel, in turn supported by high chairs on the insulated deck. The pipe is Ray-duct, a Bethlehem Steel Co. product. Headers are 2½ in. with runouts 1¼-in. dia, on 20-in. centers. Because of the high index of flow and high penetrating quality of the Sovaloid anti-freeze, almost all connections were welded. In the few screw connections needed at valves and expansion sections, DuPont's Teflon disks were specified, and a permanent, impenetrable thread sealer was used, called Expando, and made by the Expando Corp. in New Jersey.

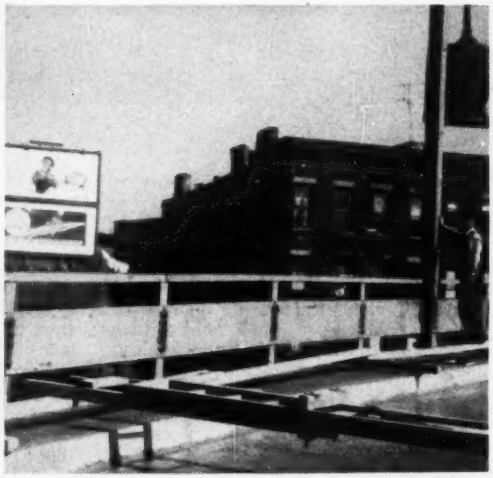
A 200-psi hydrostatic test was put on each section and held for an hour with no drop allowed. All sections were lined up with ramp slopes to insure best direct flow to return lines. The 9-in. sidewalks are for emergency and maintenance use only, and do not contain snow-melting pipes. They were poured in one sweep with the roadway and envelop Johns-Manville Transite pipe which carries wiring for lights. Decking for the sidewalks was plywood, with short stringers supported by walers hung from fascia girders. The entire set of ramps was poured with a 2-yd bucket on a Lima rig from the street level and guided by a tagman on deck.

Charlie Prokop is general super for Corbetta, and Ray Vitolo, superintendent. Frank G. Carey is resident engineer for the Port of New York Authority, assisted by Bruce Cameron and Joe Kinney, all under John M. Kyle, chief engineer.

TYPICAL HEADER, 2½-in. dia, lies alongside expansion joint with 1¼-in. dia runouts every 20 in. System contains almost 11 mi of piping.



FAST-MOVING CONCRETE CREW makes short work of 9-in. slab incasing pipes and double reinforcing. All pouring was done with cranes and buckets from street level. Additional 9-in. depth of . . .



. . . SIDEWALK WAS POURED in same single pass. Tagman near railing signals to crane operator. Note 3x4's and bolts forming extension of ladder and raised finishers' platform above walks.

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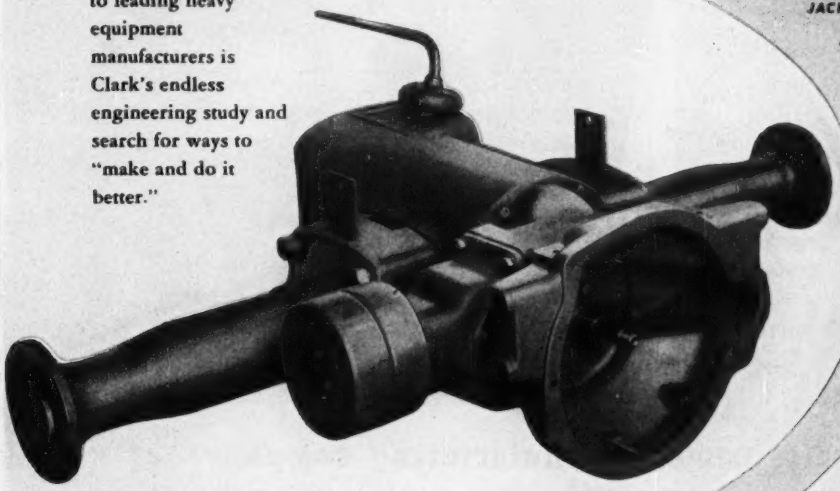

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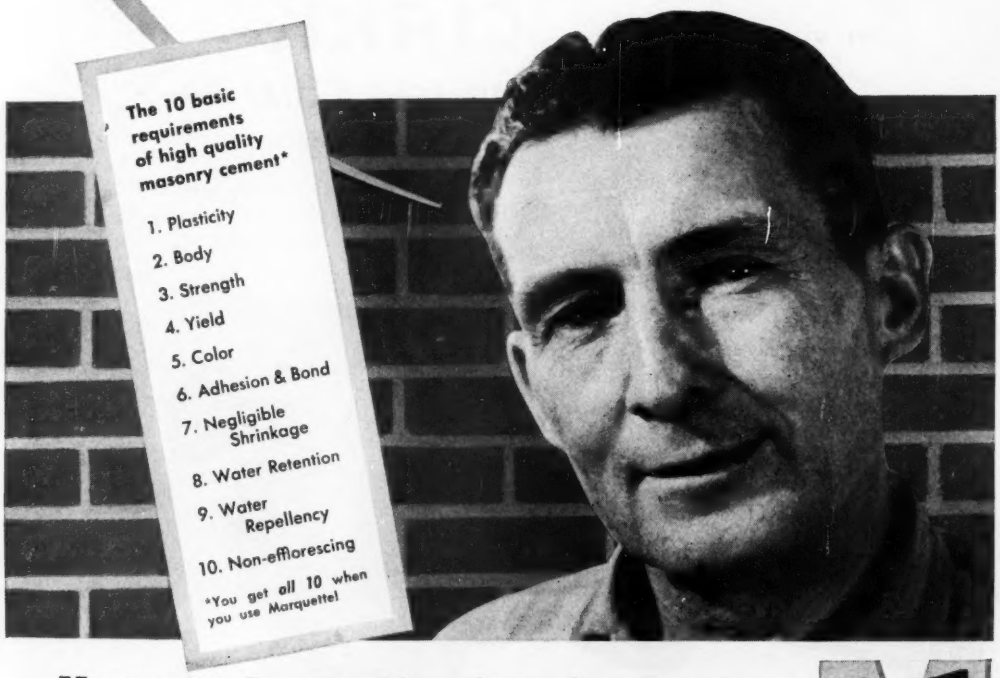
MARQUETTE Masonry CEMENT



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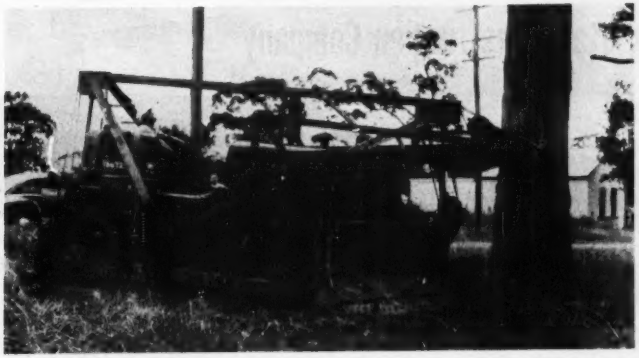
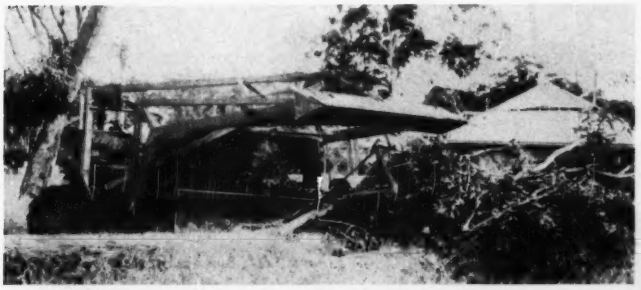
Treedozers Now Built in Australia

THE TREEDOZER, indispensable in heavy land clearing in this country, is now being built in Australia by LeTourneau (Aust.) Pty. Ltd. Some are being exported to Tanganyika for clearing virgin timber for the British Food Council's Ground Nut Project. Here are some shots of the new rig in action.



1 . . . FIRST Australian-made treedozer approaches tree with pusher blade high for leverage. Operator gives tree a couple of jolts first to shake down dead branches.



2 . . . AS PUSHER BLADE topples tree, bulldozer blade starts to cut roots loose.

3 . . . FINAL ACTION is all by bulldozer blade, which cuts remaining roots while lifting felled tree out of ground. Tree is then rolled out of way by bulldozer.

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"KING" Combination Nipple

Outstanding in its advantages over regular iron pipe nipples for connecting all types of hose. Made of non-porous tubular steel, with clean threads and deep, carefully finished corrugations.

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perform for Utah Construction Company

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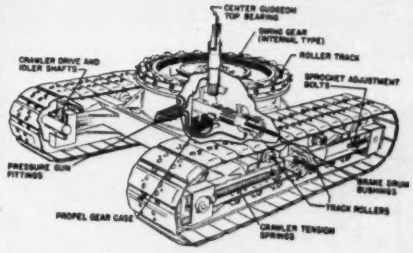
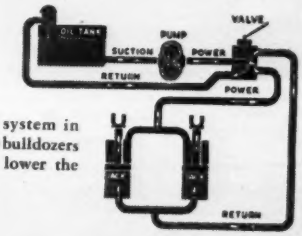


"FIG. 23

Shows internal type open gears of swing rack and one method of lubricating trunion and other shaft bearings... The 'propel' gears are enclosed and oil lubricated. The crawler track and other parts lubricated through pressure gun fittings require grease. See lubrication chart for proper type and grade..."



"FIG. 33

Hydraulic system in use on some bulldozers to raise or lower the blade."

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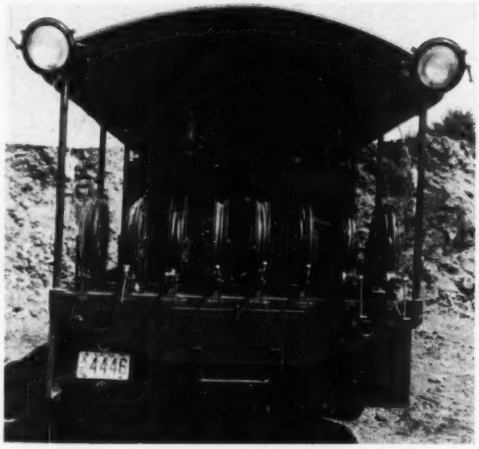


PRESENTING one of the most inclusive and coordinated maintenance dramas we've had the pleasure to witness so far:

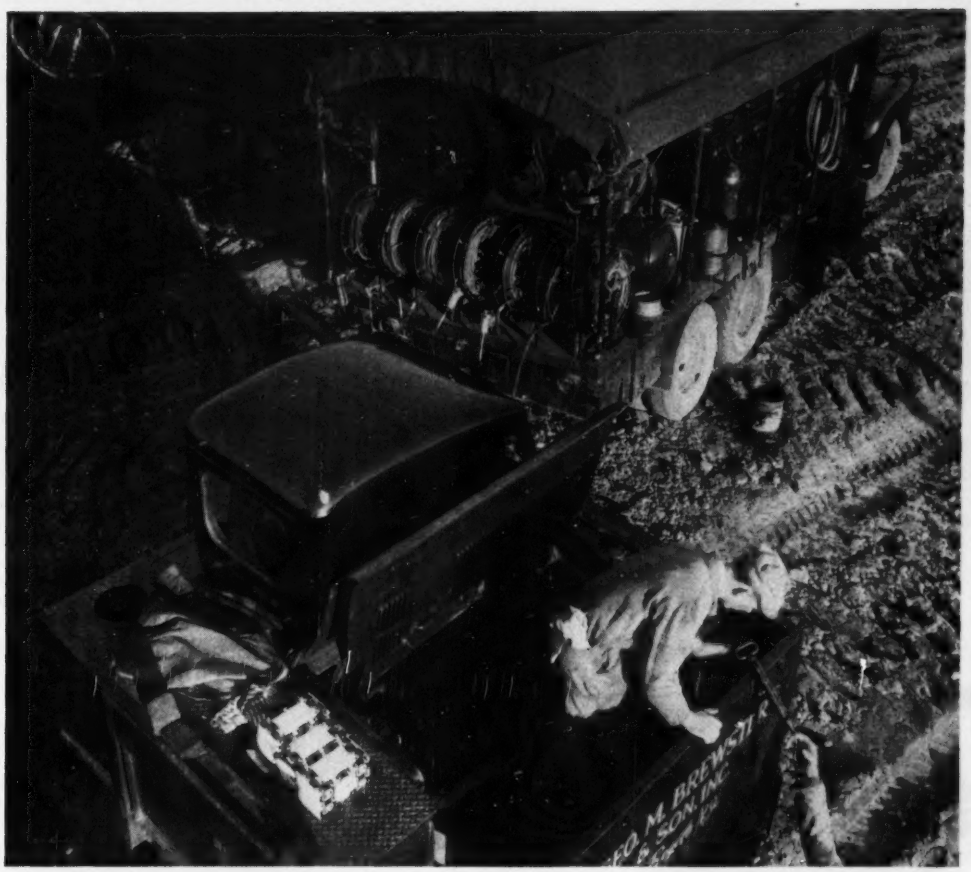
THE SCENE: New Jersey Turnpike

THE TIME: Every night at midnight

THE CAST: Maintenance crews of George M. Brewster & Son Inc., Bogota, New Jersey and four self-contained, completely equipped grease trucks.

THREE VIEWS of George M. Brewster & Son maintenance truck showing array of supplies and materials which make up complete mobile unit used nightly on New Jersey Turnpike. Each rig boasts generator, compressor, water, gas, diesel fuel and 7 kinds of oil and grease. Crews handle 275 pieces of construction equipment with 4 trucks; trailer rig handles 100 trucks.

Keep 'Em Rolling on New Jersey Turnpike



THOROUGH CHECK is given Lorain Moto-Crane on turnpike right-of-way. Oil is changed in cranes, shovels and backhoes on average of 60 hr. Oil filters are replaced with each change, fuel filters with every second change. Another Brewster rule: on truck cranes, change oil in truck and crane engines at same time, eliminating uncertainty. Each vehicle has separate lube sheet.

THE SCENE opens at 11 each night, Monday through Saturday, when the crews report for work. As they ready their trucks and load fuels and greases, Howard Heil, maintenance superintendent with more than 15 years' service for Brewster, checks the daily lubrication record book to see which of the 375 pieces of construction equipment might have been transferred to another section of the turnpike or brought in for repair. Next he speeds the departure of the mobile equipment, including a solid-body tank truck, three fuel trailers (one with gasoline, two with diesel fuel) a small maintenance trailer hauled by a pick-up and four completely-equipped and self-contained grease trucks.

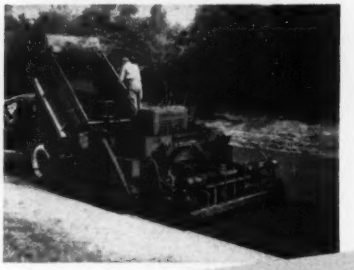
The grease trucks are the result of experiments and combined ideas of everyone in the Brewster organization from George M. Brewster, Jr., director of equipment division and Herb Looschen, lubrication engineer, right down to the drivers and grease monkeys.

Each contains a 110-v Universal generator and a Chicago Pneumatic compressor, set to pump 175 psi. A wall of sheet steel separates them from the fuel supplies. Looking down along the left side of the truck you see a row of four large and four small tanks. The first contains 250 gal of gasoline, the next three 250 gal each of No. 208 Diesel fuel and the last four 55 gal each of X.P. compound, gear oil, track roller grease and regular chassis grease. The first of two steel compartments hung in front of the double-dual wheels contains a reel with 50-ft diesel fuel hose. The second compartment carries cleaning cloths and is packed full with all sizes of oil and fuel filters. A third cabinet, behind the wheels, has 1- and 2-qt measures, grease fittings, gaskets, washers, and necessary tools for oil changes.

Walking around to the right side of the truck, another array of eight tanks is visible and clearly marked. The larger tanks run through from the other side and the smaller hold 55 gal each of water, Lo-por hoist oil, H. D.

IMPROVED AGGREGATE SPREADERS

Now available to lay up to 12" thickness in widths to 11', lesser thicknesses in widths to 12'6". Crawler or 4-wheel traction, always operating on subgrade. Accurately lay all tonnage trucks can handle—all base and surface aggregates, plant-mixed stabilized soil or free-flowing bituminous mixtures—yet cost half as much as bituminous pavers.



IMPROVED BITUMINOUS PAVER

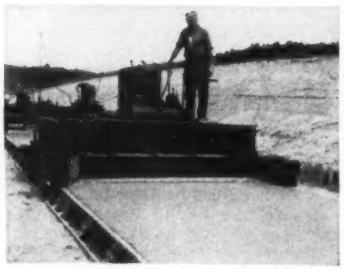
The only precision paver that automatically paves to grade line, is almost instantly adjustable for widths to 12' 6" and lays any type material to a uniform density of mat not possible with machines which must put weight or traction on the new-laid surface.

better tools for 1951 paving

JAEGER-ENGINEERED

COMBINATION SCREW-AND-SCREED SPREADERS

A major advance in concrete paving. Remix, compact, spread, strike off, *then accurately meter correct amount of material to the finishing machine by means of 12" oscillating screed.* Spreader with one finisher gives you a *3-screed paving team* that is faster, more accurate, saves labor on all work and has saved cost of second finisher on high production jobs. Spreader, alone, will both lay and finish concrete base for city streets.



DIAGONAL SCREED FINISHERS

Another labor-saving, cost-cutting advancement. Diagonally adjustable rear screed works material solidly against upper form on curves and pitched slab, increases accuracy of all finishing, avoids tearing stiff mixes.

Before you plan and bid new work, talk these tools with your Jaeger distributor—or send for complete Paving Catalogs.

THE JAEGER MACHINE CO.

800 Dublin Ave., Columbus 16, Ohio

PUMPS • COMPRESSORS • MIXERS • HOISTS • TRUCK MIXERS

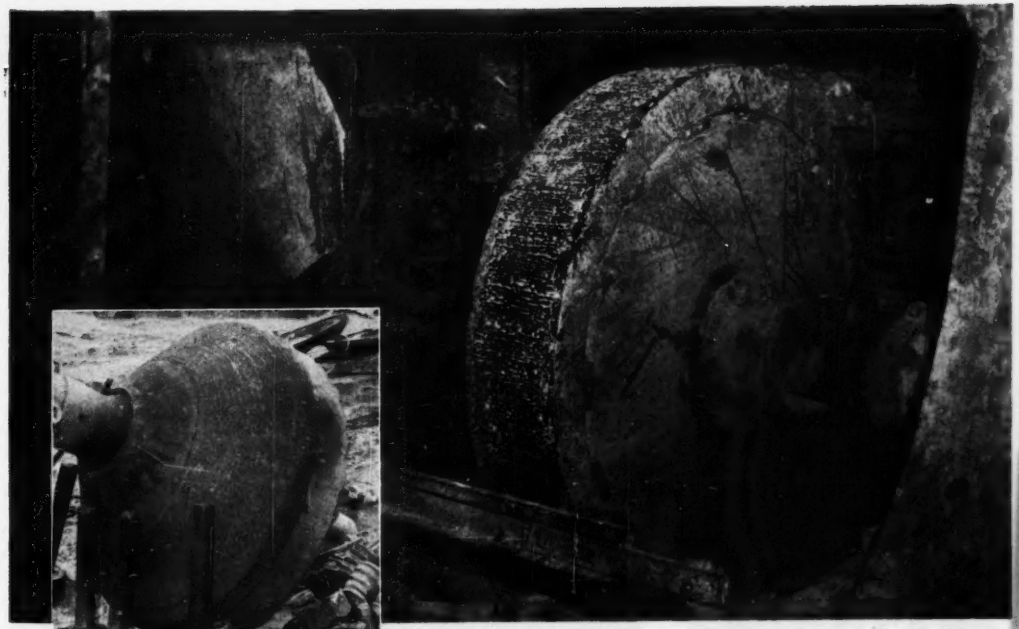
(Heavy Duty) oil No 30, and H. D. No 40. The front compartment on this side has a similar hose and reel setup, this time for gasoline. The second holds more oil and gas filters, extra cans of alcohol and Prestone, and a few special tools. The compartment behind the wheels has five 5-gal cans. Two Alemite 10-gal high-pressure hand pumps complete the supplies. For safety, two Sno-fog fire extinguishers are within easy reach. Along the back of the truck is an array of eight Alemite reels which feed out required amounts of air and the seven types of oils and greases in the smaller tanks.

The generator powers a large floodlight over the truck cab, two more on the rear, three lights under the roof of the rig, a light in each of the six compartments and the two fuel pumps. Outlets are located conveniently for use of power tools when needed. The compressor delivers air directly to its own reel outlet and activates the plungers in each of the tanks. Brewster bought only the four heavy-duty Mack truck chassis, and built in their Bogota shops bodies, tanks and pipe-frames with side and top roll-curtains. Now that you've met the principal characters in this drama of upkeep and preventive maintenance, let's move on:

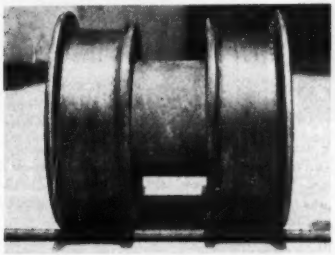
Scene one: Alongside a shovel in a borrow pit. A quick look at the lube report for this machine shows that it's due for an oil change. All shovels, cranes and backhoes are checked for an oil change every 60 hr. And whenever oil is changed, oil filters are replaced. This is a must on Brewster jobs. What's more, with every second oil change fuel filters are replaced, too. Expensive? Not in the long run. This way there's no doubt or uncertainty. All vital parts are greased, meanwhile, by the second member of the two-man team.

Scene two: Next to three compressors in a rock cut. One man handles the engine, the other the compressor unit and tires. These happen to be Ingersoll-Rand 500's with Waukesha engines. The schedule calls for engine oil change every 100 hr, including the oil filters of course. Air cleaners are washed at this time as well as the crankcase screen. A short run and the truck stops next to a Buffalo-Springfield roller on the

(Continued on page 76)



CRUSHERS, including gyratory mantles, jaws and roll types continue to operate when built-up with Stoody Manganese and hard-faced with Stoody Self-Hardening 21. Gyratories and roll types are easily hard-faced automatically.



TRACTOR PARTS, such as rollers, idlers, pads, etc., easily outlive several new parts when wearing areas are kept protected with Stoody 1027. Automatic application cuts costs on many parts.

CONVEYOR BUCKETS When lips are protected with Stoody Self-Hardening, conveyor buckets continue to carry full payloads long after ordinary buckets are reduced to partial efficiency or worn beyond further use.

MULLER TIRES last indefinitely when hard-faced occasionally with transverse stringers of Stoody Self-Hardening 21. If badly worn, first rebuild with Stoody Manganese or Stoody High Carbon.

How to get along Without hard-to-get replacement parts

Heavier military demand for steel means less steel for everyone. Less steel equals fewer parts and a possible return to the old worries of keeping equipment in operation with what you have.

YOU CAN SAVE YOUR STOCK OF SPARES, you can make every part last *much* longer by hard-facing with STOODY ALLOYS now!

STOODY ALLOYS slow down abrasive wear on all equipment . . . fight wear losses resulting from heat, corrosion, and impact. They keep equipment going when the going is tough—and show remarkable economies of operation, too.

If you want to be set for the future, do your hard-facing now! And keep your equipment hard-faced with STOODY ALLOYS to insure top operating condition . . . to make every part last its utmost!

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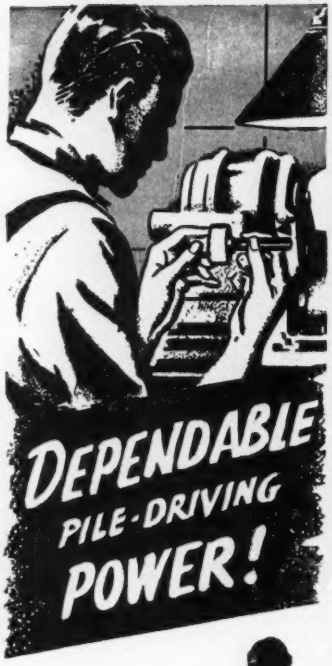
11972 EAST SLAUSON AVENUE, WHITTIER, CALIFORNIA



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SINGLE-ACTING STEAM

PILE HAMMERS

Here's the pile hammer that's built up a great reputation for dependability on thousands of pile driving jobs all over the world. It rates tops with experienced contractors because it meets their demands for speed, durability and economy. It's rugged in construction and simple in design and operation, with all working parts exposed for easy accessibility.

The Warrington-Vulcan operates at medium steam pressure, delivering a moderate frequency of low velocity blows from a relatively heavy ram to drive piles of any description.

Write today for complete details and the name of your nearest distributor.

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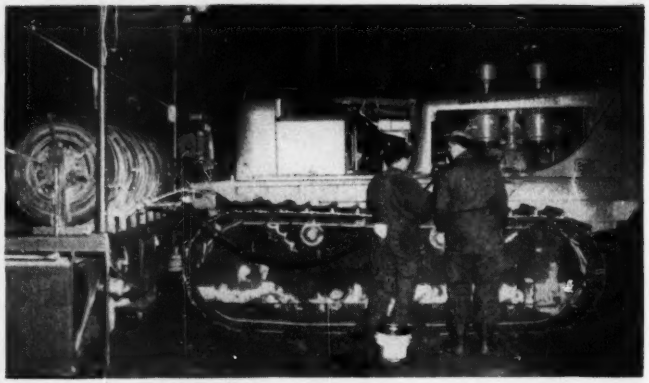
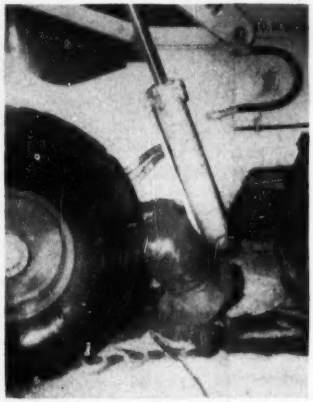
LUBRICATION TRUCKS . . . Continued



ANOTHER OIL CHANGE, this time on an Allis-Chalmers HD-19, pulled up to edge of fill. Nightly grease check includes transmissions, final drives, power units, oil in starting and diesel engines, oil steering clutches and injector pumps.



KING PIN FITTING gets a shot of grease (left) on Caterpillar No. 12 grader, along with careful look at transmission, final drive, rear end, hoist tanks, ring gear control box, etc; Nightly maintenance job goes on, fair weather or foul. Steering mechanism on Hough Payloader (right) is greased and checked for just right amount of play during downpour of rain. Batteries and tires on all rigs are checked twice a week.

MAGNET TRUCK polices haul roads to and from borrow pits; picked up 750 lb of metal in first four days, reducing nail punctures from 141 to 26 in first month of operation. Just one more example of cooperative effort in Brewster Co.'s maintenance program.

rock fill. This is greased daily and has an oil change every 75 hr.

Scene three: On the right-of-way of the New Jersey Turnpike. Here's a Caterpillar grader, Model 12. The nightly check includes regular greasing and check of transmission, final drives, rear end, ring gear control box, radiator, hoist tanks and injector pump. Next sheepsfoot rollers are checked. Four button heads are greased as well as one fitting on the drawbar.

Hough Payloaders are greased daily and radiators, transmissions, hoist tanks and rear ends checked. Batteries and tires are checked twice a week, and gear oils drained and replaced twice a year, for winter and summer use.

Old model tractors have track rollers greased daily and a check taken on transmission, power units, final drives, engine oil in starting and diesel engines, injector pumps, and oil steering clutches. At this point the greasemonkey points out that they have been instructed that the new Cat tractor has grease in the steering clutches—not oil. Also track rollers need only be greased every 120 hr and pilot bearings every 60 hr.

Scene four: Farther along the right-of-way to a spot where Euclid wagons and end-dumps are lined up. These rigs are thoroughly greased every other day when one shift is running, once a day on double shifts. The nightly check includes all universals, motor oil, hydraulic steering reservoirs and hoist tanks. Oil is changed on the average of 60 hr, along with oil filters. Air cleaners and breathers are covered at the same time, but oftener if dust and dirt conditions warrant. Nugent bags are replaced in the crankcase of the Cummins diesels every 150 hr. Tires and batteries are checked twice a week.

Scene five: A parking field with floodlight towers illuminating 100 of Brewster's 10-wheel tandem drive heavy-duty Mack haul trucks lined up in four long rows of twenty-five each. Every 1,000 mi the oil and two oil filters are changed, the air cleaners washed, and a check made on differentials, steering posts, lights directional signals, generator, batteries, water pump and tires. The portable trailer behind the pickup carries the necessary items for checking all haul trucks and the gasoline wagon can refuel as many

(Continued on page 78)

DELIVERING WET CONCRETE
direct from mixer truck to second floor pouring operation with a gas engine driven Farquhar Trough Conveyor saves time and money for the contractor . . . hard, back-breaking work for men.

Get *MORE* work done . . . in *LESS* time . . . at *LESS* cost with FARQUHAR TROUGH CONVEYORS

A Farquhar Trough Conveyor takes the place of several men . . . speeds up all materials handling . . . releases manpower from handling jobs to do more *actual construction work!* Contractors everywhere are saving *time, money, labor* with Farquhar Conveyors, moving wet concrete directly from mixer to work area without loss due to repeated handling. Farquhar Conveyors help you speed up your construction jobs . . . eliminate profit losses due to behind-schedule work!

For *All* Handling Jobs . . . in *All* Industries

All through industry you'll find Farquhar Conveyors saving time, money and manpower . . . handling sharp and abrasive materials with the same ease and efficiency as fine, powdery substances . . . and doing it *faster, better, cheaper!* Contractors, chemical plants, warehouses, department stores, *all* industries, turn to Farquhar for answers to their specific materials handling problems. Farquhar offers you a complete line of conveyors for portable, semi-permanent, or permanent use, to handle any and all kinds of loose or packaged materials, speed up handling operations, cut labor costs! Send for information *now* on the Farquhar Conveyor that can *save you money!*

FREE INFORMATION

A. B. FARQUHAR COMPANY
232 Duke St., York, Pa., or
622A W. Elm St., Chicago 10, Ill.

Gentlemen: Please send me complete information on Farquhar Trough Conveyors.

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Address .....
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HYDRAULIC PRESSES • FARM EQUIPMENT • FOOD PROCESSING AND SPECIAL MACHINERY

Yes,

Just a Piece of Wire

BUT...

upon its quality and fabrication depends the kind of wire rope service you will get.

If this wire goes into a rope of 6 x 19 Seale Construction with a fiber core, it will be just one of 114. But if it is a "HERCULES" (Red-Strand) Wire Rope, *every* one of the 114 wires will have been rigidly tested to our exacting standards as to *all* essential properties. Furthermore, the rope will have been designed and fabricated according to the most advanced methods of manufacture.

Only by strict adherence to such principles, can the highest quality in wire rope be produced—*consistently*. It is never a matter of chance.

Because of long experience and the exacting care always used in making "HERCULES" (Red-Strand) Wire Rope, you can depend on it for safe and economical service. Made in a wide range of constructions – either Preformed or Non-Preformed, there is, *in this one grade*, a "right rope" for any heavy duty job.

MADE ONLY BY

We Invite Your Inquiries

A. LESCHEN & SONS ROPE CO.

ESTABLISHED 1857 **5909 KENNERLY AVE. • ST. LOUIS, MO.**

New York 6 · Chicago 7 · Birmingham 6 · Houston 3 · Denver 2 · Los Angeles 21 · San Francisco 7 · Portland 9 · Seattle 4

(Continued from page 77)

as 12 trucks before moving to a new location.

Final scene: Back to maintenance headquarters—an old railroad roundhouse taken over by Brewster in Secaucus, N. J. Trucks are usually in by 6:30 am with sheets properly marked with unusual items such as excessive use of oil or anti-freeze, gear oil leaks, etc. Another day's work about to start and another page turned in the maintenance book.

For several months the Mack trucks were running two shifts; the first from 6 am to 2:30 pm, the second from 2:30 to 11 pm, and the "fueling on the fly" operation was poetry in motion between shifts. Two sets of refueling and maintenance trucks were lined up facing each other on the right of way at 2:15 pm. As each truck dumped its load and came off the fill, 10 men literally swarmed all over it. Two refueled, two checked oil, two checked tires for low pressures and/or flats, two on the radiator and batteries, and the last pair on lights, windshield wipers, directional arrows, etc. Fueling usually took 1½ min, the other activities 3½ min more. Total: 5 min and the truck was on its way for the second shift with a new driver.

Running on this grueling double shift, the only time haul truck tires cool off sufficiently to give a correct pressure reading is at midnight Sunday nights, when they have been standing for almost 24 hr. Therefore, a special tire crew makes the rounds late every Sunday evening. The regular maintenance crew is augmented each Wednesday evening for a master radiator check, with accurate readings taken and recorded, and a double check made on extra anti-freeze consumption.

During last October, tire changes on haul trucks reached a new high of 233. Something definitely had to be done, so more Brewster brains got together. A DC generator was rigged up on a crash truck, and a powerful magnet hung behind it, about 4 in. off the ground. This rig policed the haul roads, the driver turning in painstaking reports of time, roads, etc; even to what lanes were covered on those roads. Results: November tire changes were down by 118 to a low of 115. Nail punctures fell from 141 to 26. And in the first four days of operation the magnet truck

(Continued on page 80)

SIX LaPLANT-CHOATE MOTOR SCRAPERS

complete a 60 day schedule

IN 39 DAYS!

"On the Malton Airport job in Toronto, we had 60 days to move 426,000 cu. yds. of dirt. Our six LPC Motor Scrapers finished the job in 39 days! We're buying three additional units to help us move dirt faster on future big jobs."

ELGIN ARMSTRONG
Armstrong Bros. Construction
Brampton, Ontario

ON Toronto's Malton Airport project, the six LaPlant-Choate Motor Scrapers owned by Armstrong Bros. Construction *cut schedule time by one third!*

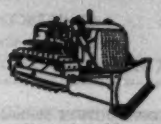
The job called for moving 325,000 cu. yds. of heavy clay over a 1000-ft. one-way haul, and approximately 100,000 cu. yds. over a 4200-ft. one-way haul. On the 1000-ft. haul each Motor Scraper averaged 15 loads per hour with an average pay load of 14 cu. yds. On the 4200-ft. haul each unit averaged 7.9 loads per hour with an average 13.5 cu. yd. pay load. These fast 4 and 7.5 minute cycles are typical of the big production features of the fast-stepping, power-packed LPC Motor Scraper.

Your LPC distributor can show you Motor Scrapers at work. When you call him, ask him to tell you about the new, larger engines—either the Buda 280 h.p. or Cummins 275 h.p. Diesel, that give you more *usable* power and speed for schedule-trimming production. LaPlant-Choate Manufacturing Company, Inc., Cedar Rapids, Iowa—LaPlant-Choate Sales and Service, 1022 77th Ave., Oakland, Calif.

LaPLANT-CHOATE

Cable-operated Scrapers in 6-, 8- and 14-yd. sizes for all makes of track-type tractors.

2- and 4-yd. Scrapers for track-type and rubber-tired industrial tractors.



Hydraulic and Cable-operated Dozers.

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Welding and Cutting Equipment Since 1910

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acetylene
carbon dioxide
compressed air
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liquid petroleum gases
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TORCHES for
air gas
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flame cutting
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heating
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WELDING ROD for all uses

HARD-FACING alloys

BLASTING nozzles

PNEUMATIC regulator-filter-lubricator

CYLINDER MANIFOLDS for all types of cylinder gases

CYLINDER TRUCKS

Unlimited Opportunity for Expansion
All VICTOR welding and cutting units handle a wide variety of welding and cutting jobs. To expand them for new needs or special work—descaling, flame cutting, multi-flame heating, priming, etc.—just select the VICTOR tip, nozzle or attachment your job requires.

Low First Cost
When you use VICTOR you keep your investment in line with production . . . you buy only parts or attachments as needed . . . not a whole new outfit.

Low Operating Cost
Finally, because you can use the exact tip or nozzle needed for each job, you get better flame control, use less gas, and do better, faster work.

See for yourself why so many welders say it costs less to own and operate VICTOR. Ask your VICTOR dealer for a free demonstration TODAY.

WC-1 large capacity unit. Cuts metal up to 18" thick; handles all ordinary welding jobs.

WRITE today for descriptive literature and name of nearest distributor.

VICTOR EQUIPMENT COMPANY
3821 Santa Fe Ave., LOS ANGELES 58 — 844 Folsom Street, SAN FRANCISCO 7 — 1312 W. Lake St., CHICAGO 7

(Continued from page 78)

picked up 750 lb of junk—nails, spikes, tobacco tins, license plates, shackles, U-bolts, exhaust baffles, bumperettes and almost every other kind of metal imaginable.

Top man in the Brewster lubrication organization is Herb Looschen, assisted in the main office by Bob Musgrave. Howard Heil is lubrication foreman on the job. The crews include two supervisors, two clerks, six men responsible for batteries and tires, five fuel men (with two more part-time helpers), thirty-five lubrication men, and two handling anti-freeze. Sounds like a big, expensive organization, but it's cheap in the long run. Not one of the 375 pieces of equipment has ever been brought in unexpectedly because of a breakdown. One master mechanic for another contractor on the Turnpike summed it up this way: "You know that George M. Brewster outfit? The M stands for Maintenance!"

Gus Rayner on New Job

A. J. (Gus) RAYNER has been named executive secretary of the New York State Bituminous Concrete Producers Association, an organization of blacktop contractors, aggregate and asphalt producers established in 1945. Gus announces that the association headquarters will be moved to Albany, N. Y., from Schenectady.

He is an old hand in this association business, as he helped organize the Virginia Road Builders Association and served as its first secretary. Then he went with the Associated General Contractors of America as special field representative, organizing chapters in West Virginia, Louisiana, New Hampshire and North Dakota. Gus also knows the asphalt business, as he was a sales representative of the Barber Asphalt Co. for years.

DON'T LET THIS HAPPEN TO YOUR COPIES OF "CM&E"!

Remember:

When you move or change jobs, we need at least 3 weeks *notice* to guarantee uninterrupted service on your subscription. So please send your new address, together with your old one to:

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CONSTRUCTION METHODS & EQUIPMENT
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Need a new Shovel? Crane? Dragline? Pull Shovel?

IT WILL PAY YOU TO CONSIDER

LIMA

Here's why

LIMA MACHINES are designed and built for hard usage. All components are engineered for long-life, trouble-free service, maximum production and operator convenience.

LIMA FEATURES—Anti-friction bearings at all vital bearing points, independent boom hoist, extra sturdy, heavy crawler base and rotating base, rugged, large diameter clutches and brakes, maximum weight behind center of rotation, LIMA Precision Air Control on all except the ¾ yard size—these are a few of the features contributing to outstanding, continuous performance.

THE LIMA LINE—includes a complete range of shovels from ¾ to 6 yards, cranes to 110 tons, draglines, variable. Crawler, truck and wheel-mounted types are available. Most types are quickly and easily converted from shovel to crane or dragline, and vice versa.

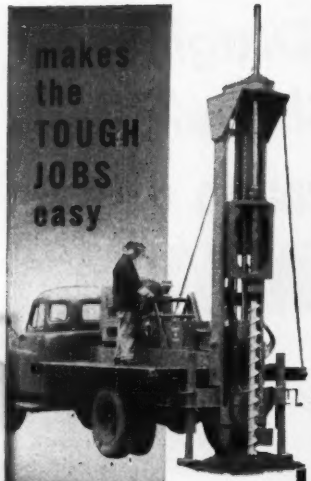
LIMA SERVICE is based on our sincere policy of being as interested in the continuous satisfactory service of LIMA machines as you are. Our regional offices and many distributors stock LIMA parts. Orders for maintenance parts get first priority at the factory.

LIMA REPRESENTATIVES are seasoned shovel men, qualified to help you select exactly the right equipment for your needs. A letter or 'phone call will put them to work on your problem.

So, we say, consider LIMA. It costs nothing to get the facts.

Offices are located in the principal cities of the U.S. and the world. If you do not know the representative nearest you, write us and we'll tell you where to reach him.

Lima Shovel and Crane Division
Baldwin - Lima - Hamilton Corporation
Lima, Ohio, U. S. A.



McCarthy

MOBILE-MOUNT VERTICAL DRILL FOR BLAST HOLE DRILLING

McCarthy Vertical Drills are compactly designed for truck, half-track or caterpillar mounting. They adapt to any job where soft rock formations are to be removed, and their tough, simplified construction means bigger profits through reduced drilling costs and increased drilling speeds.

McCarthy Drills are equipped with plenty of power and finger-tip controls. They're easy to set up and easy to move about.

See your McCarthy Dealer today or write us direct for complete information. Our 48 years of experience can mean vastly increased profits for you.

Makers of Drilling Equipment Since 1901

SALEM

THE SALEM TOOL CO.

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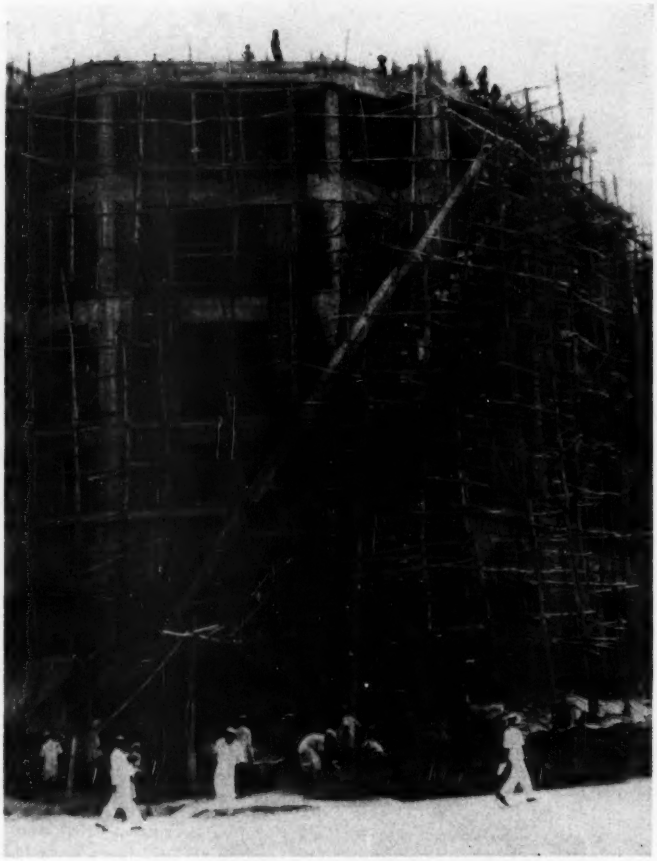
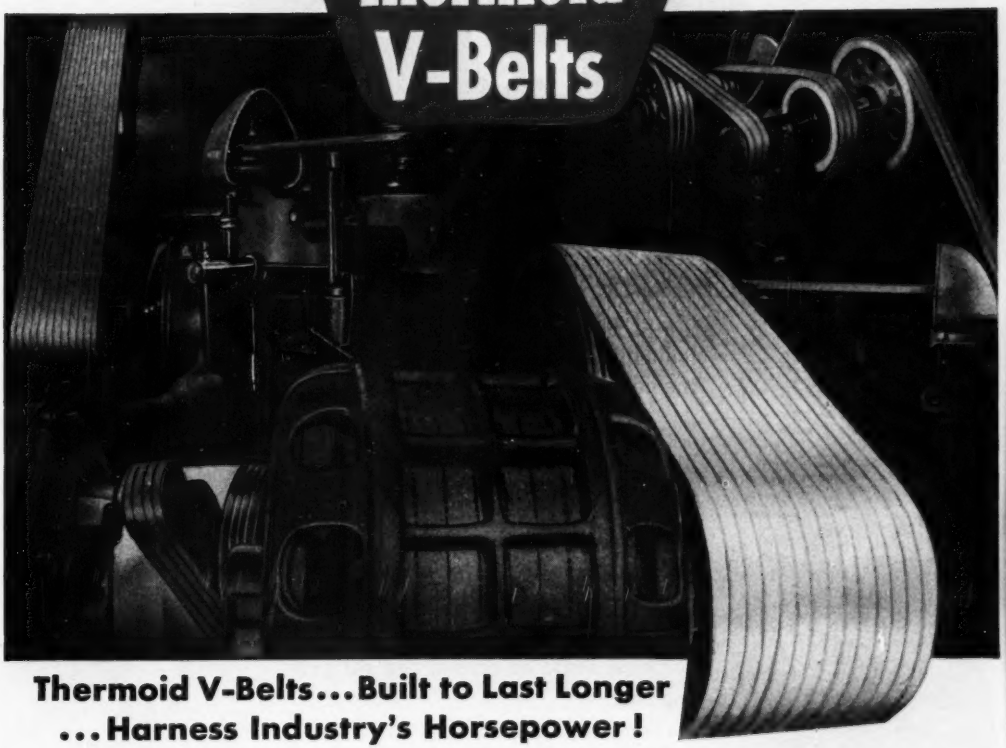


That Old Look on India Construction

PICTURESQUE METHODS of construction like these employed on the building of new quarters for The Mercantile Bank of India Ltd. in Bombay, now in the second year of work, are evidence of the shortages of materials and not stubborn rejection of foreign techniques. There's not enough wood or steel for fancy scaffolding, so lashed bamboo does the job. There's not enough cement to justify faster pouring of concrete; big mixers and machine conveyors would be idle much of the time; and the cost is low for human power.

So coolies, paid about 50c. U.S. a day, pass basins of mixed concrete up a scaffolding stairway to the forms and the empty containers are dropped down the slide above them. When shortages of materials hold up work or weather intervenes, the coolies are laid off and overhead is cut substantially. Building contractors point out that even though bigger and better mechanical equipment could be used in big cities, the next job may be hundreds of miles away and the overworked railways unable to transport the equipment to the new sites.—*McGraw-Hill World News Photo*

Specify Thermoid V-Belts



Thermoid V-Belts...Built to Last Longer ...Harness Industry's Horsepower!

From the smallest fractional horsepower size to the largest multiple V-Belt . . . Thermoid top-quality serves the needs of every industry. Thermoid V-Belts mean longer-than-average wear, maximum power transmission without slippage and lowest over-all operating costs.

Thermoid V-Belts are specially impregnated to withstand excess moisture . . . abrasion . . . acidity . . . all those elements that hasten belt deterioration. *They are prestretched to insure perfect operation without adjustments.*

For smooth, efficient performance . . . for ability to absorb repeated shock loads . . . for lowest cost per hour . . . specify Thermoid V-Belts. Call your nearest Thermoid Distributor today. He has a complete range of sizes available to meet your requirements. And for your special belt problems, Thermoid Field Representatives are always available to help you select the right belt for the job.

It will pay you to ***Specify*** Thermoid

Thermoid Quality Products: Transmission Belting • F.H.P. and Multiple V-Belts • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Molded Products • Industrial Brake Linings and Friction Materials.

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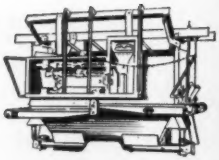
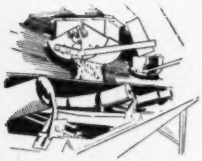
TO GET THINGS DONE IN '51— SEE BUTLER BIN



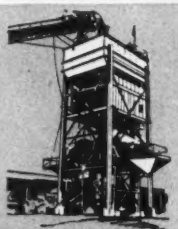
WEIGHING BATCHERS

New standards of accuracy and efficiency from a roadbuilders batcher to completely automatic, recording weighing batchers for high production ready mixed concrete operations.



BUTLER BIN GATES

Bin gates are subject to heavy wear. Keep extras on hand to avoid shutdown. BUTLER makes them in rotary, clamshell, roller and radial types.



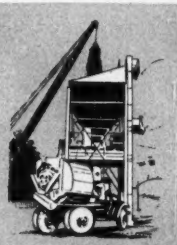
CENTRAL MIXING PLANTS

BUTLER PLANTS are widely recognized as examples of brilliant engineering in a great variety of materials handling problems. Here the experience of the BUTLER Engineer is invaluable.

1951 will be a year of action and unprecedented production. The highway program is expanding at an accelerated pace. Demand for Ready Mixed Concrete is climbing week by week for building construction is still far behind the nation's requirement.

Production schedules such as these mean modern equipment—and modern equipment means BUTLER and BUTLER *Engineered Design.*

In your plans for new plants—or for modernizing existing equipment "to get things done in '51" it's the soundest of common-sense to consult the BUTLER engineer.



READY MIXED PLANTS

Ready Mixed Concrete Plants for every production level — engineered by BUTLER for the highest efficiency and lowest cost operation.

AGGREGATE PLANTS

Highly portable, quickly erected, BUTLER Aggregate Plants save time and money in meeting high pressure paving schedules.

BULK CEMENT PLANTS

A wide range of capacities for every roadbuilding job. Faster batching, split-pound accuracy. Shown is the CR-37-58 providing 650 bbls. capacity.

BUTLER BIN CO.

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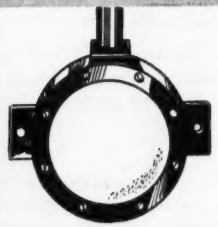
Compressor, engine, pump and complete controls all in one compact, space-saving unit. The BUTLER CEMENT AERATOR is essential to a smooth flow of cement.

CONCRETE PRODUCTS PLANTS

BUTLER engineers have an international reputation for highly efficient design in Concrete Products Plants. BUTLER offers an engineering service that assures a maximum profit.

THE NEW BUTLER '102' SCOOP

Faster forward travel (11 miles an hour), a turning radius of only 6'3", the new BUTLER '102' is tops in maneuverability and efficiency.



BIN LEVEL INDICATOR

A new BUTLER development, a truly trouble-free, positive, accurate Bin-level Indicator. Works successfully with a great variety of materials.

SUN-BAKED South Dakota Prairie soil is tough loading in spots. Here two Caterpillar D8 pushers are necessary to load LeTourneau scraper in Oahe Dam borrow pit.

Dirt Rolls at Oahe Dam

NO ORDINARY BORROW PIT is this one on Stage I earthwork contract at Oahe Dam, for take a look at those steep pitches in background. Don't let that loose appearance of soil fool you, either, for it's hard a few inches down.

FIRST EARTHMOVING CONTRACT is building up base of dam above right valley floor. Scrapers spread fill thin, are followed closely by sheepsfoot rollers.

SIX MILLION YARDS is a lot of dirt on anybody's job, but the first stage excavation contract for that volume at Oahe Dam on the Missouri's main stem above Pierre, S. D., is only the beginning. Before the big embankment—242 ft high and 9,300 ft long—is completed there will be some 78 million cu yd moved and placed as rolled fill.

Oahe Dam, one of the major projects in the Pick-Sloan plan for development of the Missouri River Valley, is under the direction of the Omaha District Engineer, Corps of Engineers. Its earthwork volume rivals that of Garrison Dam, now under construction on the Missouri above Bismarck, N. D., and the Oahe 21,800,000-acre ft reservoir will extend almost to Garrison.

Besides the main embankment at

IT'S GOING TO TAKE 78 million yd to plug the Missouri at this point, so first 6 million yd will just about level off section on this side of the river. From bluff to bluff the dam will extend a mile and three-quarters.

Oahe there will be a power installation of 450,000 kw in five units fed by five 24-ft tunneled penstocks, all on the left bank. On the right bank will be four 24-ft tunnels and controlled outlet works, and far back from the dam will be an uncontrolled spillway channel cut through the hills.

New access roads have been built from Pierre, 6 mi downstream, to the site on both sides of the river, and a 6-mi railroad spur on the right side is now under construction. Considerable job housing has been built at Pierre, including remodeling of several barracks at an old air base.

The first contract for the dam proper was let late last May—Stage I earthwork on the right bank—for 6,000,000 cu yd to Guy H. James, Oklahoma City, for $2,280,717. This yardage is mostly being taken out of the outlet works cuts and spread over the valley floor next to the river as the base for the main embankment on that side of the stream.

James sublet about 3½ million yd to the combined firm of Campbell-Collins of Fargo, N. D. The subcontractors planted their part of the job with ten LeTourneau Model A Roadster tractor-scraper units, seven hauling LeTourneau E25 scrapers, three pulling E35 scrapers (see front cover). Six of these units were brought in from Shade Hill Dam, 190 mi away, under their own power. Caterpillar D8 pushers, bulldozers, four LeTourneau W scraper units and three Tournapacker rollers complete the Campbell-Collins array of dirtmoving equipment.

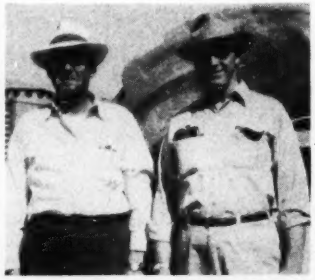
Reports from the job indicate the Model A scraper outfits are performing remarkably well. They have been assigned to the long haul from outlet channel cut to the fill, averaging 1½ mi round trip. Material is tough to load and haul, consisting of gravel, shale, sand and clay. The top strata appear to have been baked (Editor's Note: Sounds plausible to one who knows that sun-baked valley). Often two D8 pushers in tandem are required for loading.

Loading times and distances vary considerably due to necessity of selecting soils from different parts of the borrow area. Best timed performance was loading the scrapers down a 35% grade in the pit in a distance of 75 ft in 0.66 min, with one D8 pusher. Toughest loading cycles as timed were loading distances from 175 to 250 ft on the level in an average of 1.54 min with two D8 pushers.

The time studies were made when the loaded haul averaged 0.7 mi down a 9% grade; the return was 0.8 mi up a 14% grade. Yet the scraper units made a round trip in the average time of 13.1 min divided as follows: Fixed time at cut and fill, 5.0 min; load haul 2.0 min at 20 to 25 mph, return light 8.1 min in second gear.

This cycle averages 3.8 trips per 50-min hr. The E25 scrapers haul 16 yd per trip, or 61 cu yd per hr; the large E35's haul 21 yd, or 80 cu yd per hr.

The project is under the general direction of Col. Henry J. Hoeffer, Omaha District Engineer. Lieut.-Col. A. D. Starbird is resident engineer for the Corps of Engineers. John Beck is superintendent for Campbell-Collins.



TWO DIRTMOVERS on first job at Oahe Dam are John Beck, superintendent and Kenneth Collins of Campbell-Collins, who have contract for 3½ million yd.

MAKE MORE *Profit* ON EVERY CONCRETE CONSTRUCTION JOB

WHETHER your job calls for building a turnpike or paving main street—use the low cost, assembly-line efficiency of the Blaw-Knox "Complete Package" of balanced construction equipment. It contains everything you need . . . from handling material to finishing the slab . . . for the lower cost operation that comes with modern mechanization methods.

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CAMPBELL'S CORNER *A Monthly Equipment Maintenance Feature*

By HOMER C. CAMPBELL, Service Manager, H. W. Moore Equipment Co., Denver, Colo.

Preventive Maintenance

RECENTLY, while visiting a friend who has had long experience in bridge building and highway construction, we asked him what he thought of preventive maintenance. His answer was short and readily understandable. "If a guy spends good money to buy good equipment to make him more money, why in hell shouldn't he protect that investment with good care of the equipment?"

There is really nothing new about preventive maintenance. Up until about thirty years ago we were doing chores around the barn or feed lot, tending to the horses and mules, repairing harness, and greasing and painting wagons. Wheel scrapers had to be repaired and slips kept in shape. The blacksmith was a busy individual, and yours truly pumped a forge many hours for that worthy craftsman.

Then we got into mineral power instead of animal power, and maintenance of the internal combustion engine and its allied equipment became necessary. We tried to make a mechanic out of that faithful blacksmith. And we did, for a while. But then a new class of craftsmen came into the picture —the heavy-duty mechanic. We tried to give our equipment good mechanical attention. However, as we stated in a previous issue, the service or preventive maintenance requirements of some of those early models of mineral power took most of the day. Later, the situation improved. And, frankly, we believe that until World War II, power equipment was getting better service than it is today.

How it Happened

The war came along and everything definitely had to be done yesterday. There was no tomorrow. It seems that during this period of get-it-done we developed a lot of slap-bang methods. It would appear that anyone that could still breathe was used as an operator or maintenance mechanic. This is, of course, an exaggeration, but nevertheless true in the direction it points. We were too busy building a bridge or a new highway, or expanding plants. We all had someone looking down our necks. Hence, there was no time to maintain equipment as it should have been. Now we are paying the penalty. Every good heavy-duty equipment maintenance shop is working to capacity. And any good shop mechanic will tell you that, so long as we have poor operators and no preventive maintenance, he is assured of good employment.

A planned program of preventive maintenance will cut down your unnecessary shop costs. Your operating and mechanical organization having to do with the equipment should be trained to make all preventive maintenance procedures a habit. We perform most of our daily duties by habit, so the care of equipment can be made a habit—along with just a little thinking and use of good common sense.

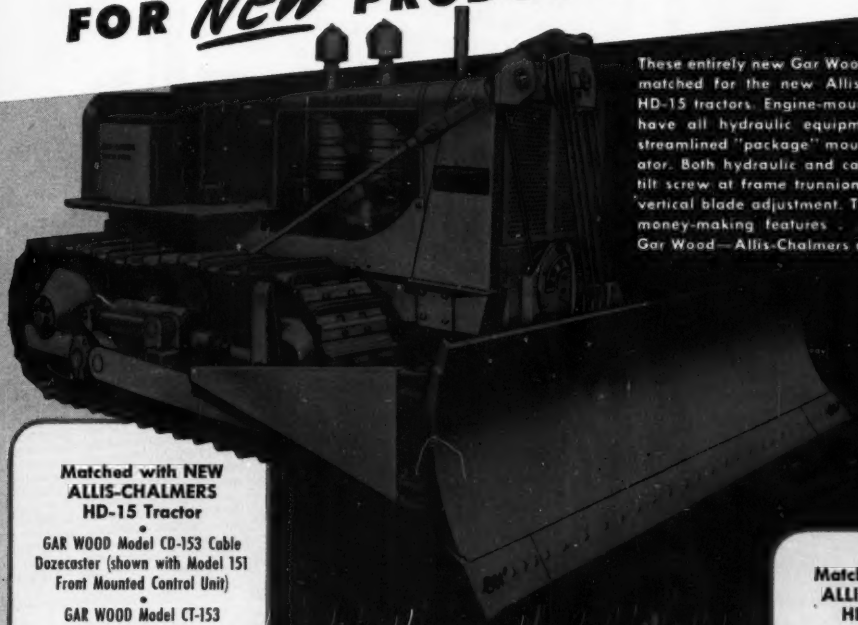
Daily maintenance procedures definitely fall into the habit category. While making the daily rounds on the equipment, common sense and a sense of observation enter into the picture. The person doing the routine operations must learn to look for and observe any unusual items on the equipment that need attention—a loose nut here, a bad wire there. It doesn't come under the normal heading of work; it is merely being alert to the job at hand. The man doing a lube job on a truck, for instance, has the best opportunity to see the under side of the unit. And he can save his employer a lot of time and money by keen observation of the mechanism underneath and so reports his findings to the next in line.

Who's Responsible?

Without preventive maintenance, extra equipment costs are being added to your job costs. They will be added sooner or later in the form of labor and parts bills from your commercial repair shop or your own shop. And the reason is simply that the equipment is permitted to get into such bad repair from day to day. To use an old expression, the nut to keep tight is always the loose one. Seriously, that one is the source of your expensive repair bills. And when you get one of these big bills it might be well to see the man who, in many cases, is responsible for this. You will find him in your mirror.

new GarWood DOZERS

FOR *NEW* PRODUCTION RECORDS



These entirely new Gar Wood dozers are perfectly matched for the new Allis-Chalmers HD-9 and HD-15 tractors. Engine-mounted hydraulic dozers have all hydraulic equipment in one compact streamlined "package" mounted over tractor radiator. Both hydraulic and cable dozers have new tilt screw at frame trunnions for easy and quick vertical blade adjustment. They have many other money-making features . . . ask your nearest Gar Wood—Allis-Chalmers dealer.

Matched with NEW ALLIS-CHALMERS HD-15 Tractor

- GAR WOOD Model CD-153 Cable Dozecaster (shown with Model 151 Front Mounted Control Unit)
- GAR WOOD Model CT-153 Cable Tipdozer
- GAR WOOD Model HD-153 Hydraulic Dozecaster
- GAR WOOD Model HT-153 Hydraulic Tipdozer

Matched with NEW ALLIS-CHALMERS HD-9 Tractor

- GAR WOOD Model HT-93 Hydraulic Tipdozer (shown)
- GAR WOOD Model HD-93 Hydraulic Dozecaster

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now TWO MORE

HD-9

WEIGHT: 18,500 lb.
70 DRAWBAR Hp.
GM 4-71 DIESEL ENGINE
SPEEDS: 6 forward, to 5.68 mph.;
3 reverse, to 4.43

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POWER, WEIGHT, BALANCE put them in a class of their own — never such traction . . . such pulling, pushing or lifting ability. And the smooth-operating GM 2-Cycle Diesel engines work without strain under the most extreme conditions.

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All parts are designed and built to carry their loads with a margin of safety. No need to go to a larger tractor just for strength alone. The HD-9 and HD-15 set new standards for tractor quality.

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for Easier Control and Greater Operator Comfort— Easy-shift transmission • Self-energizing brakes • Booster steering controls • Adjustable, cushioned seat • Wide arm rests • Convenient controls and pedals • Full visibility • Instant electric starting.

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✓ For Greater Production
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HD-15

WEIGHT: 27,500 lb.
102 DRAWBAR Hp.
GM 6-71 DIESEL ENGINE
SPEEDS: 6 forward, to 5.80 mph.;
3 reverse, to 4.51

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New ractor Standards

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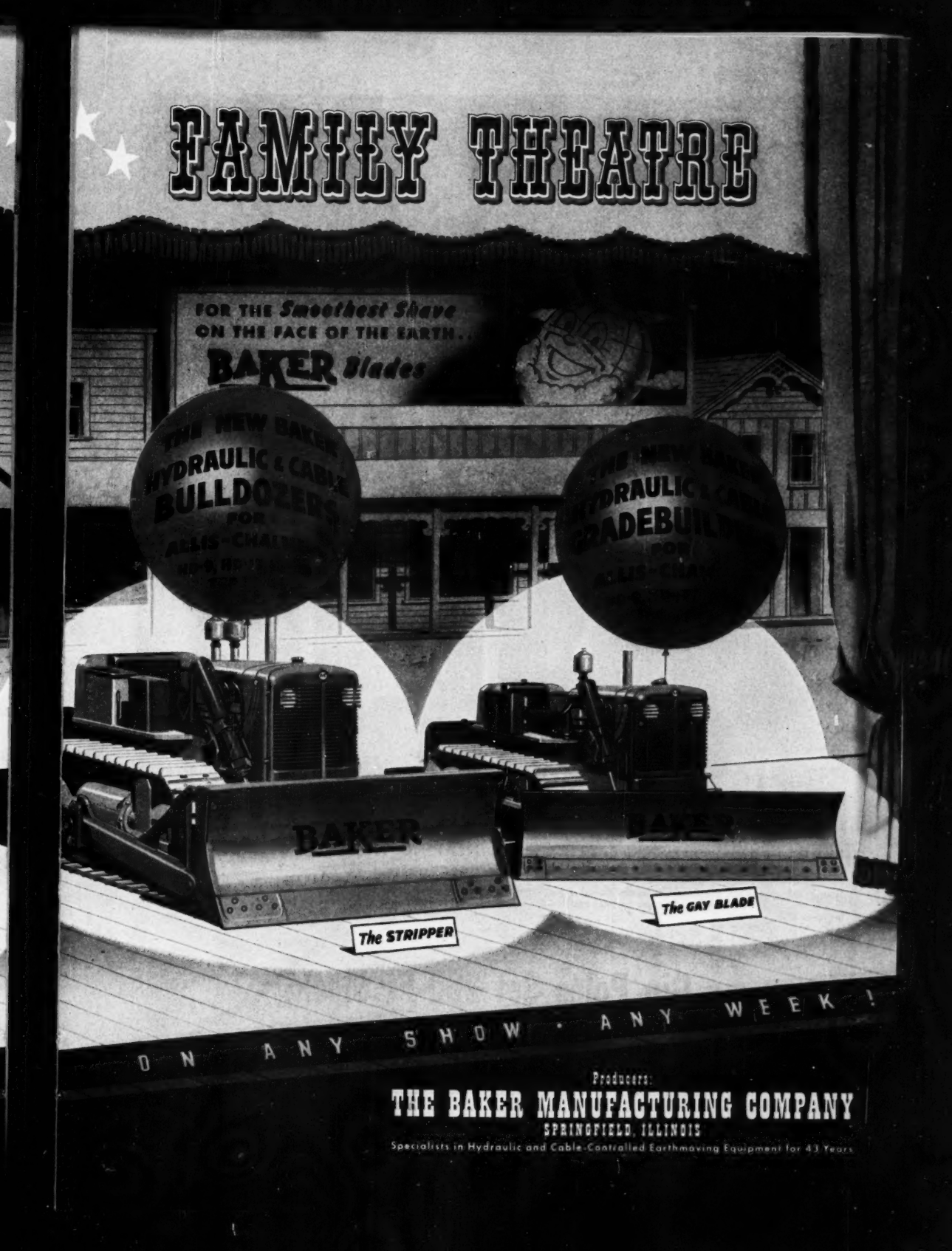
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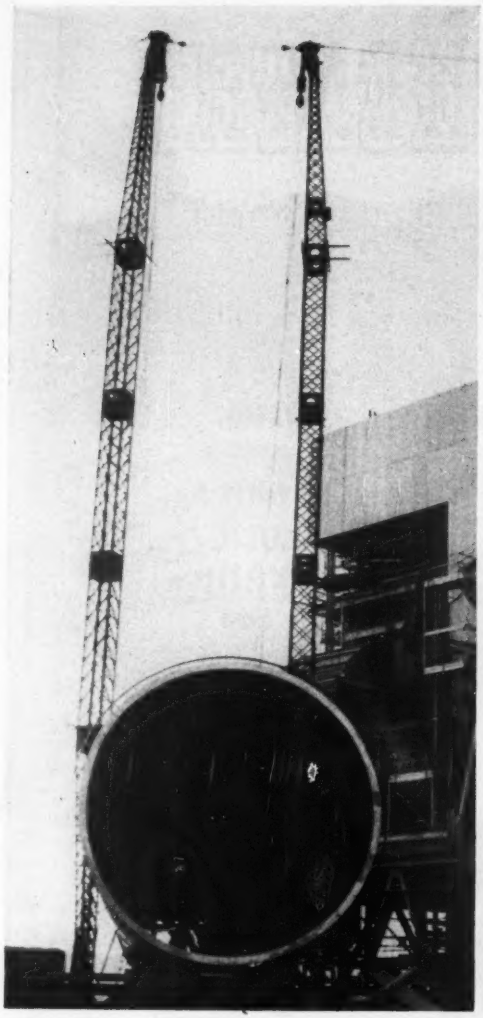
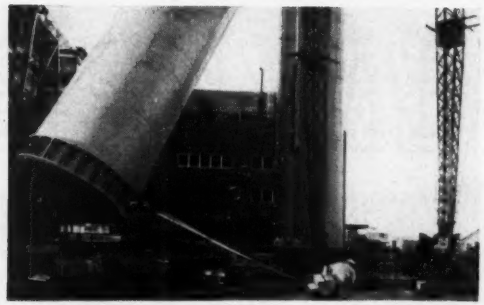
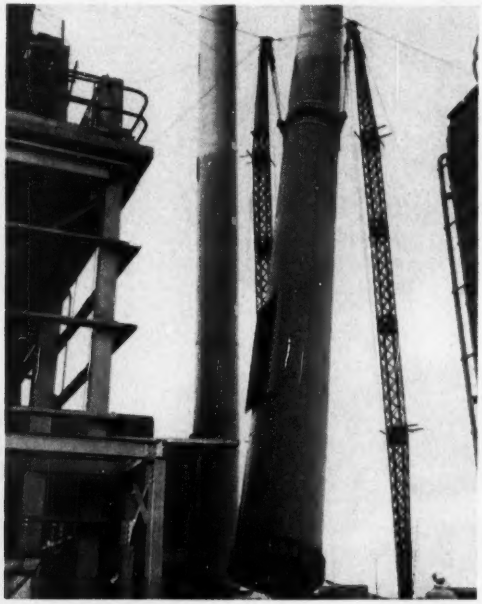




UP SHE GOES— Base of stack rides sled on greased skids, pulled along by separate hoist line, during early part of lift. Multiple-part snubber line, good for 40,000-lb pull, helps steady bottom end of long cylinder as it rises into air.



READY— Fabricated steel stack, 11 ft dia and 200 ft long, lies between guyed gin poles at West Coast power plant all ready for hoisting to erect position. Block-and-falls line between mast rooster tops is not a cross-tie, but is cable cradle, called a marriage line by riggers, for juggling stack into exact vertical position for lowering over anchor bolts.

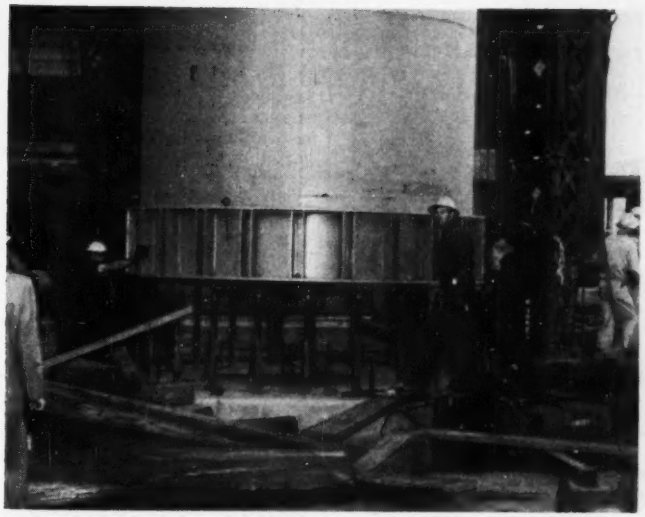
NEARING THE END— Gin poles are now carrying full stack load through 11-part ¾-in. lines, each set powered by 50-hp hoist. Hitch is by 2-ton corset lashed around stack just above center of gravity. As stack nears vertical position, hand winch slacks off marriage line between tops of gin poles, shown in first picture, to let pipe lay back into cradle.

Gin Poles Set 200-Ft Stacks

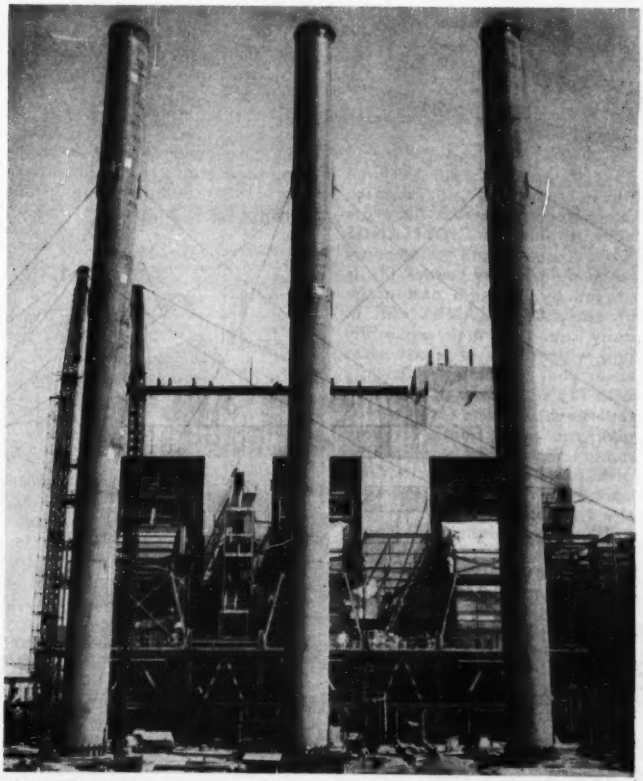
A PAIR of 120-ft guyed gin poles set six 200-ft steel stacks in fast time at the Pacific Gas & Electric Co.'s new steam plant near Antioch Calif. The stacks, 11 ft dia and weighing 63 tons each, are believed to be the largest ever erected in one piece.

Fabrication and erection were by Consolidated Western Steel Corp., subcontractor for the Bechtel Corp. in the $51,500,000 project. Consolidated fabricated the stacks in three sections at its shops and welded them together at the site. H. M. Wiley was superintendent in charge of erection.

The accompanying pictures show the job.



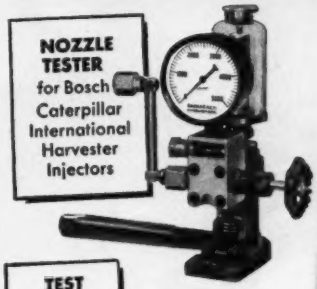
SLACK OFF—When in vertical position, stack is lowered down over 2½-in. anchor bolts 7 ft long buried in pile-founded concrete base. Marriage line at top of stack helps maneuver bottom to right spot over anchor bolts.



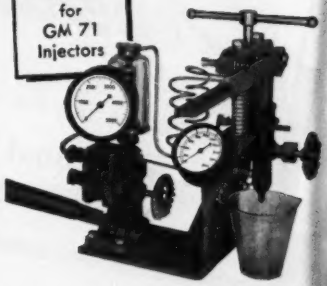
HALF DONE—Here are three of six stacks all set up ready for hookup to boiler room. Stacks are lined with 3-in. Gunite, except top 5 ft is lead lined. Average time for erection of each stack is only 30 min.

NEW DIESEL TUNING TOOLS

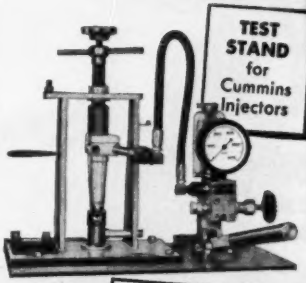
NOZZLE TESTER for Bosch Caterpillar International Harvester Injectors



TEST FIXTURE for GM 71 Injectors



TEST STAND for Cummins Injectors



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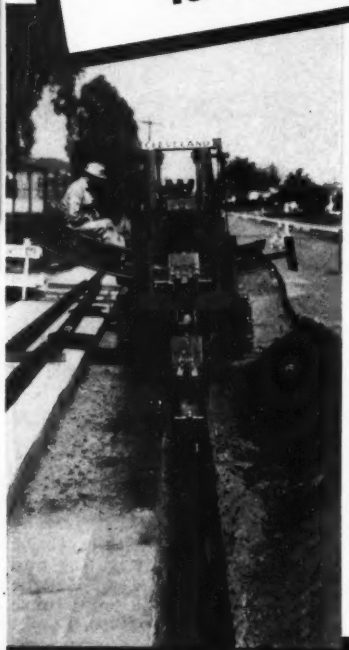
—your best investment for trenching profits



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Earthmoving

(Continued from page 57)

Dry, loose sand offers little resistance to cutting edges, requiring less drawbar pull than common earth. But it does not boil up in a scraper bowl, and takes operator techinque to load properly. Rock may require special shooting or crushing to be an acceptable fill material. Moisture may give the material lubricating properties, causing it to slide easily; or just as likely, turn it into a sticky mass, equally difficult to load or spread. Material may acquire voids in loading to swell 30% in the scraper load and then be compacted to 10% less on the fill than its original volume at the cut. Then 10 cu yd at the cut becomes 13 yd in the scraper and 9 yd on the fill. The contractor must recognize this condition and apply it to the terms of payment to bid the job intelligently.

4. Climatic Conditions, Drainage

The contractor needs to know how many days of the time allocated him in his contract will be working days.

Excessive rainfall, springs or bogs may produce sloppy underfoot conditions, slowing or stopping production entirely, and making aeration or drainage of prime importance. Conversely, lack of

rain can create dusty conditions requiring watering of cut, fill and haul roads. If work must continue, even under adverse weather conditions, it may be necessary to root frozen ground. Extreme heat or cold will affect efficiency of both machines and operators.

The number of machines and working shifts depends directly on the estimated number of working days available within the contract limit.

5. Altitude

Engine performance is greatly affected as altitude above sea level

(Continued on page 100)

Basements for BUS STATIONS or BUNGALOWS dig 'em with LORAINS

6 LORAINS 1 BASEMENT

If it's a city "block buster"—like this Chicago Greyhound Bus Terminal job of *Harlihy Mid-Continent Co.*—you may need a fleet of Lorains. Here, 6 of their 21 Lorains—from the smallest to the largest—excavate a half city block.

Photo Courtesy Chicago Sun-Times

1 LORAIN 3 BASEMENTS

Contractor *Joseph Wagner* wanted to dig many basements per day—for new homes in Buffalo, N. Y. He picked a new, fast-digging Lorain-TL Hoe to fit his needs. And he gets an average of 3 straight-walled, square-cornered foundations averaging 270 yards each, out of a day's work.

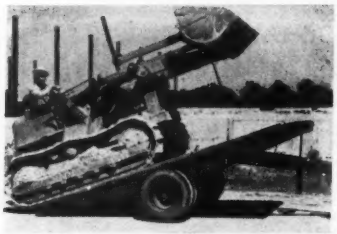
CELLARS—or skyscrapers! Rock—or rubble! You name it—and your Thew-Lorain Distributor will carefully analyze your needs and "tailor fit" your job for the greatest profit margin. You'll choose from 6 "series" of machines—in the ½ yard to 2 yard classes—10 ton to 45 ton cranes—on standard, long, or wide crawlers—or single-engine and two-engine rubber-tire carriers—most of them fitted with interchangeable shovel, crane, dragline, clamshell or hoe. Then you're in business to make money—with the *best buy* for your job.

THE THEW SHOVEL CO. • LORAIN, OHIO

THEW **LORAIN**®

on CRAWLER or RUBBER

SHOVELS
CRANES
DRAGLINES
CLAMSHELLS
HOES

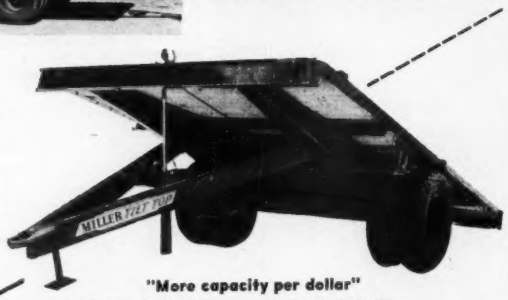


you can..
HAUL faster..
LOAD easier..

Model "B" 10 ton
Only $1095, prices subject to change without notice.

The following equipment is optional and extra. Hydraulic tilt control, two speed winch, electric brakes.

IMMEDIATE DELIVERY



"More capacity per dollar"
with the RUGGED MILLER Model "B" Tilt-Top

MILLER Tilt-Top trailers save man hours—give new mobility to every piece of equipment. Self powered equipment is simply driven on or off tilted platform—dead equipment is easily pulled on with optional hand operated winch.

All steel, X braced frame has tapered side channels and integral straight-through axle. Standard platform is 14'x8', optional 16' available. Platform, tires, Timken bearings, pintle eye and dual Budd wheels are all standard equipment.

MILLER Tilt-Top TRAILERS
RAY MILLER RESEARCH ENGINEERS

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As we enter our 75th year of manufacture, we are grateful to the many customers and devoted distributors, who have learned that the name JACKMANCO stands for quality of manufacture and superior performance on the job.

WHEELBARROWS
DRAG SCRAPERS
MORTAR PANS
MORTAR MIXING BOXES

CONCRETE CARTS
LAWN ROLLERS
SALAMANDERS

JACKSON MANUFACTURING CO.
HARRISBURG • PENNSYLVANIA

(Continued from page 98)

increases. Engines take air directly from the atmosphere and, without supercharging, will lose manifold pressure in direct ratio to the decrease in atmospheric pressure. Reduction of manifold pressures result in lower cylinder head pressures (since compression ratio is fixed) and a consequent loss of power.

The power loss for diesels has been computed at 3% for each 1,000-ft rise in altitude. Loss of power results in longer loading time, smaller loads, and greater haul time, all of which adds up to less yards per hour and greater cost per yard.

6. Haul Roads, Grades and Distances

Haul road construction or improvement and maintenance is a direct cost of earthmoving. In most cases, the construction of good roads with low rolling resistance and high tractive efficiency is an investment that pays in increased yardage. Blading and watering with auxiliary tools where quantities and distances are great will keep the contractor's production tools at peak efficiency on the job for which they were designed. It is important to the contractor to know that rolling resistance and tractive efficiency directly limit the size of the load and the speed at which it can be moved with the available power. Distances can be measured accurately and should be known. Guessing at haul lengths can be disastrous.

It has been found that adverse grades increase rolling resistance by 20 lb per ton for each 1% of grade. Conversely, a favorable grade adds power in equal ratio, making downhill loading a smart practice. On hauls, however, a favorable grade may not necessarily be negotiated at a faster rate than an adverse one unless it is long and gentle, or unless the braking ability of the equipment is excellent. In making his bid, the contractor should get grades and distances correctly. A small error can mean greater cycle time through the necessity of dropping back into lower gear or of hauling farther; making for lower yardage and higher costs.

7. Fill Specifications

Specifications may call for compaction of material on the fill to be made by certain equipment and at a given moisture content, which can slow the job and make extra

expense for the contractor if his compacting tools cannot keep ahead of production. In recent years, however, engineers have come to recognize the compacting effect of large rubber tires over tin-spread layers, and the contractor using machines of this kind often finds he needs less special tamping equipment on the fill. Under these conditions, the material is spread and compacted in one continuous cycle of operations, eliminating some additional equipment.

8. Finishing Specifications

Into every contract and project are written certain specifications which must be completed before the job is considered finished.

Finishing is just what the term implies. It is the final polishing-off prior to handing the job over

to the contractual party or ultimate user. For instance, all contours, shoulders, and slopes of cut and fill may need to be finished by sod or seeding. In other cases, quantities can be moved and the job be left in rough finished conditions.

9. Operating Efficiency

A man or a machine may work 60 min out of the hour or for several hours, but eventually minor delays will occur due to planning and layout of the job. This may involve waiting for other equipment or operations, service and adjustment, or personnel. Operating efficiency is the percentage of productive minutes to working minutes and is considered separately from major delays due to weather or machine downtime.

Because of the occurrence of these and similar factors, an efficiency rating must be placed on any project. Since one contracting outfit will work more efficiently than another, there can be no method of definitely fixing this value except by book records of the individual. Experience has shown, however, that it is difficult to work consistently at a higher productive efficiency than a 50-min hr (83%).

(Continued on page 102)

"We Specified VIBER Vibrators Exclusively on this Big Job"

20 YEARS
EXPERIENCE MAKING ONLY CONCRETE VIBRATORS

Viber Company has spent over twenty years in research, development and field tests on concrete vibrators. This concentration has produced dependable vibration equipment

ACCEPTED by ENGINEERS and CONTRACTORS the WORLD OVER

Literature will be furnished immediately upon request.

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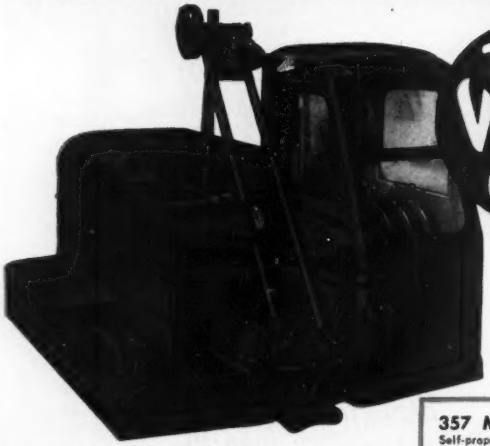
1 of 10 Reasons Why UNIT is a Better Machine



UNIT was the first manufacturer to "break" from the old style, conventional type cab in favor of the more modern Full Vision Cab. There is no other cab like it—streamlined to the minute in design, without sacrificing headroom, weight, or capacity. It offers unexcelled visibility, with all the room needed to operate in real comfort and safety. Large, shatterproof safety-glass windows, on all four sides, provide more light and give full protection against inclement weather. Windows on both sides can be raised or lowered by crank action—the double front window folds and slides up out-of-the-way. Convenient sliding side panels, and easily lifted top hood covers give ready accessibility to main machinery, engine parts and assemblies. Broad platform walks, on both sides, make it especially easy to service at any point. The UNIT Full Vision Cab has superior design that outdates all others—constructed to assure efficient and safe operation.

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Self-propelled . . . Powered by ONE engine . . . controlled and operated by ONE man . . . the smoothest operating and easiest handling crane made . . . Compact, it has light-truck mobility . . . operates with speed and economy . . . on or off the highway.

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Crawler and Mobile models — ½ and ¾ Yd. Excavators. Cranes up to 20 tons capacity.

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Stang WELLPOINT SYSTEM

For KNOW-HOW • ENGINEERING • SUPERVISION • EQUIPMENT • to keep jobs DRY

The Stang System has proved its efficiency and economy on both large and small jobs all over the United States. Stang engineering and supervision in planning, installation and operation insures a DRY JOB at all times.

JOHN W. STANG CORPORATION
2 Broadway, New York 4, N. Y. — 2123 S. 56th St., Omaha, Nebr. — 8221 Atlantic Ave., P. O. Box 631, Bell, Cal.

(Continued from page 101)

10. Time Element

Into most earthmoving contracts are written specific limitations as to when the project must be completed. The contractor's ability to work within these set limitations governs, to a large degree, his profit or loss.

Accounting for all the factors that affect production, the problem is but that of taking daily production quotas and putting enough machines on the job to handle it.

Big, modern shovels and loading equipment and high-speed, rubber-tired scrapers and hauling units enable the contractor to meet his completion date with the minimum of equipment. When making an estimate, check carefully the performance of the equipment recommended.

Every factor already mentioned has a direct bearing on the time required to complete the job.

11. Operating Costs

Earthmoving, like any other business, requires intelligent management of the project in order to realize profit.

From the standpoint of figuring costs, the following factors should be considered:

Fixed Costs: Equipment depreciation and write-off, insurance, interest, and taxes.

Operating Costs: Payroll, repairs and maintenance, fuel and lubrication, tires

Overhead

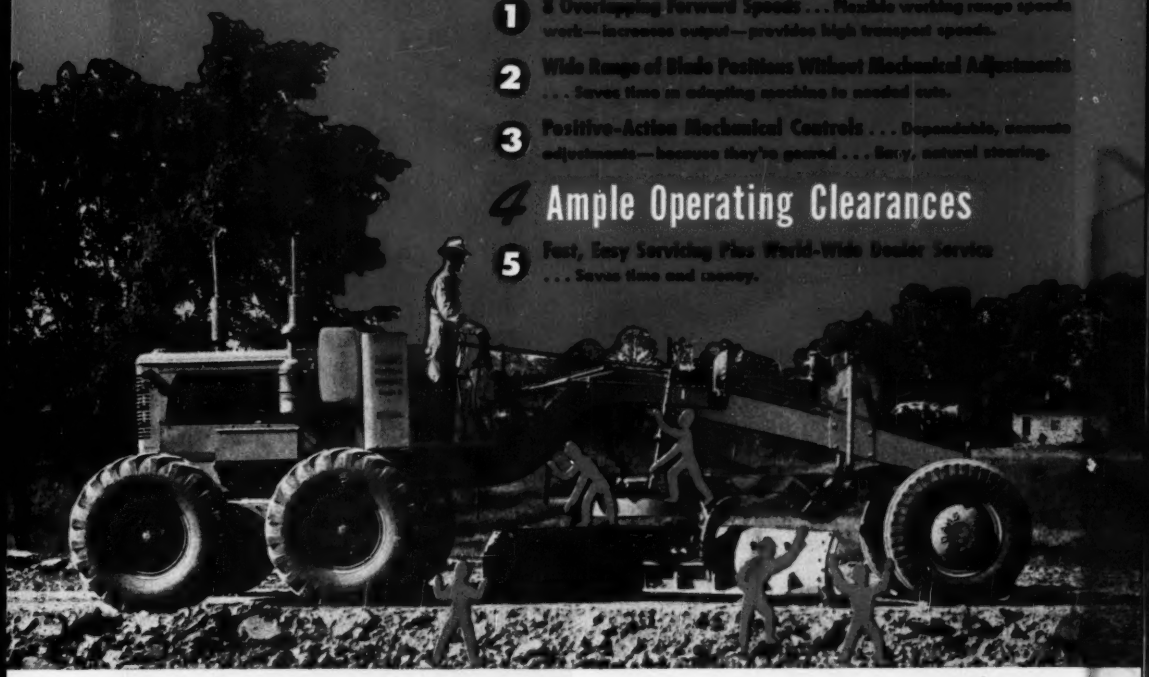
Supervision

Just how these costs are estimated will be discussed in a later chapter. It is enough now that we know them to be the end product in job analysis.

Ed. Note: The second article in this series will appear in the February issue.

Only Adams

gives you this exclusive combination of advantages



1. **8 Overlapping Forward Speeds** . . . Flexible working range speeds work—increases output—provides high transport speeds.
2. **Wide Range of Blade Positions Without Mechanical Adjustments** . . . Saves time on adapting machine to needed cuts.
3. **Positive-Action Mechanical Controls** . . . Dependable, accurate adjustments—because they're geared . . . Easy, natural steering.
4. **Ample Operating Clearances**
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Quick, easy adaptation to work . . . operator comfort, convenience, efficiency

Blade clearance—plenty of it, in the right places—is essential to fast, efficient blade positioning. That's why Adams Motor Graders are designed and built with an abundance of blade clearance at these critical points:

- **Between Blade Ends and Tires:** Lots of room here for sharp blade angles—without tire interference, front or rear.
- **Between Blade Heel and Frame:** Plenty of space provided for free movement.
- **Between Blade Assembly and Frame:** Adams arched frame permits higher blade lift—better clearances in coming out of ditches and in getting over sharp-angle approaches to bridges and rail crossings.
- **Between Blade and Scarifier Block:** Ample room for easy reversing of blade under block.

This important feature means that all desired blade positions are obtained quickly, easily—one of the many reasons why Adams Graders are the fastest, smoothest, most accurate and efficient on the market.

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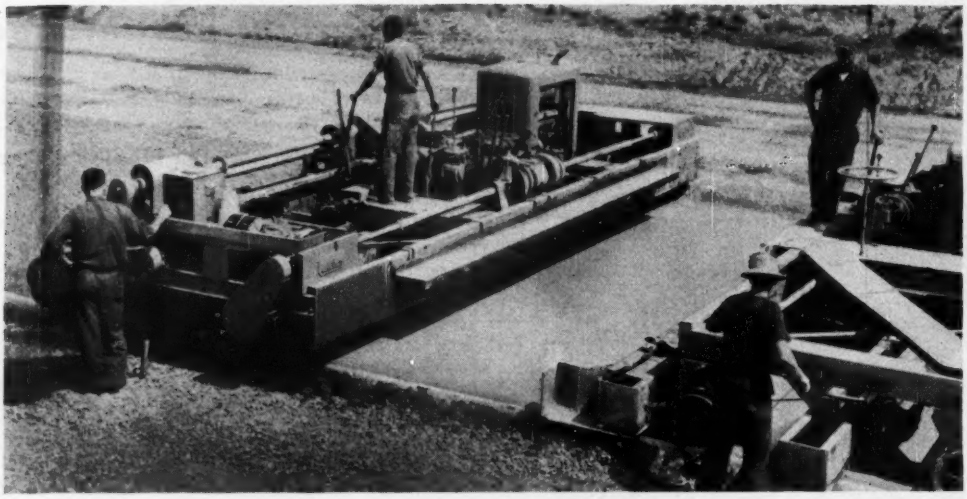
Make your next motor grader an **Adams**

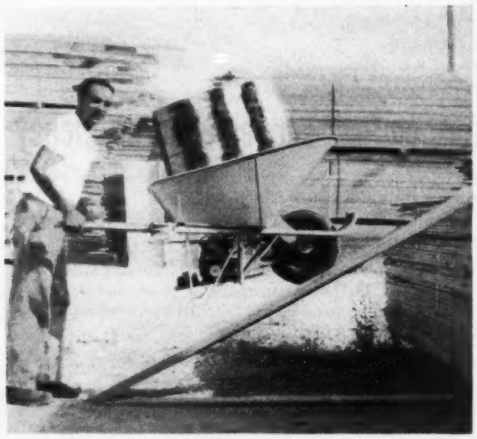
CONSTRUCTION EQUIPMENT NEWS • • A Preview of

By MELVIN DEAN, Equipment Editor



Spreader Combines Screed and Remixing-Compacting Screw

Screw-screed concrete spreader is available in two models with widths of 10 to 15 ft or 20 to 25 ft. The combined 12-in. oscillating screed and screw spreader provide the triple function of spreading, initial strike-off, and precision metering of concrete for the following finisher. Both models offer 5-ft adjustability in 6-in. stages. Spreading screw on the 15-ft model is reversible for spreading toward either side form. On the 20-ft model, screw is divided and permits spreading from center to side forms, side forms to center, or toward either side.—**Jaeger Machine Co., 800 Dublin Ave., Columbus 16, Ohio.**



POWERED BARROW PULLS UP A 40% GRADE—

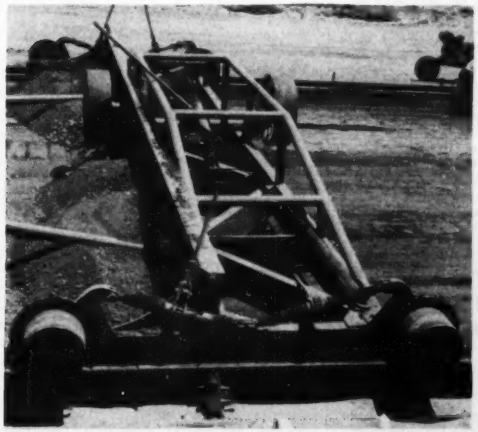
Self-powered wheelbarrow has an air-cooled engine mounted beneath the bed. Drive is provided by friction on the tire tread. Controls are located on the right handle bar. According to the manufacturer, the Pow-R-Barrow will pull a full load up a 40% grade. Compression acts as a brake on the downgrade. Speed on a level surface is a comfortable walking pace. The unit is in production and is available for delivery.—**S & S Vending Machine Co., San Jose, Calif.**

MOTOR GRADER IN EXTRA-HEAVY-DUTY CLASS—

Galion Model 118 motor grader features an improved transmission of the constant-mesh type. It has six overlapping forward speeds (1.3 to 22.6 mph) and two reverse speeds, including a high range of 10.5 mph. One lever shifts all gears, forward or reverse. Power is provided by a 100-hp diesel. All controls are hydraulic. High arch provides maximum adjustment of blade. Weights range from 23,560 lb.—**The Galion Iron Works & Mfg. Co., Co., Galion, Ohio.**

New Machinery, Tools and Equipment That Will Help You on the Job

GRAVEL PLANT FEATURES HIGH PORTABILITY— New addition to Traveler series of gravel crushing, screening, and loading plants consists of a jaw crusher, shovel-loading hopper with reciprocating feeder and trap grate, feed conveyor, one-deck inclined gyrating screen, delivery conveyor, return bucket elevator, and power unit mounted on a steel gooseneck truck with pneumatic tires. The CSE Traveler is designed to produce accurately sized material for road building and maintenance with a single crusher in a closed circuit. Four sizes are available with 916, 1016, 1020, or 1024 jaw crushers in either bronze- or roller-bearing types. The Traveler Series plants are designed for crush-and-travel operations where production requirements are moderate. Compact design with minimum weight and high portability permit them to operate in out-of-the-way locations wherever gravel is available. There are two other models (CS and TS) in the series.—**Universal Engineering Corp., Div. of Pettibone Mulliken Corp., 327 Eighth St., N. W., Cedar Rapids, Iowa.**



SUBGRADE PLANER FOR CONCRETE PAVING— Ferguson planer cuts an accurate subgrade for concrete paving up to 25 ft wide. Designed as a heavy-duty rigid machine that will not deflect under extreme loads, it is especially suitable for airport work. Blade will cut from 6 to 14 in. in depth and is instantly adjustable by rachet jacks acting independently on each wheel. Moldboard handles standard or specially curved blades. Weight is 10,000 lb.—**Shovel Supply Co., 4900 Hines Blvd., Dallas, Tex.**

IMPROVED CRAWLER-TYPE DIESEL TRACTORS— New tractors announced by Allis-Chalmers are the HD-15 (illustrated) and the HD-9. The HD-15 weighs 27,500 lb and has a drawbar hp rating of 102. The HD-9 weighs 18,500 lb and develops 70 hp at the drawbar. Both have six speeds forward and three reverse. Power is provided by heavy-duty GM 2-cycle diesels. Unit-assembly construction simplifies repair and maintenance. —**Allis-Chalmers Mfg. Co., Tractor Div., Box 512, Milwaukee, Wis.**

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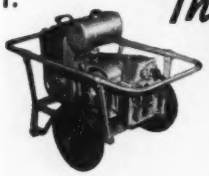
HIGHWAY
WIDENING
and PATCHING
BRIDGE DECKS
SPILLWAYS
and
MANY OTHER JOBS

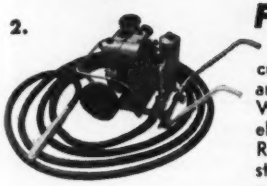
The JACKSON

1.



ELECTRIC, VIBRATORY
SCREED is
FAR FASTER-BETTER!

2.



It strikes off to any crown, undercuts at curb or sideform, works right up to and around manholes and other obstructions. With it center construction joints may be eliminated and full widths (up to 30') poured. Requires only two men on widest slab, due to strong tendency to propel itself. It's the only screed that can be rolled back on 4 rollers for second pass. Contractor has only to secure plank cut to proper length and crown to be set for any job. Powered by Jackson 1.25 KVA Portable Power Plant.

3.

6.

4.

IDEAL VIBRATORS FOR
EVERY TYPE OF JOB

1. Power Plant used with Screed, 1.25 KVA. Others of 2.5 and 5 KVA capacity — all produce both single and 3-phase 110 V., 60 C. AC and have generators requiring no maintenance or adjustment. 2. Hydraulic vibrator with time-saving 50' reach. 3. Powerful, easy to handle electric Vibrator — shafts up to 28'. 4. Finest of engine-driven flexible-shaft vibrators. 5. Revolutionary, fast, granular soil vibratory compactor. 6. Heavy-duty mass construction vibrator — a "must" on dams, etc. 7. Sideform Vibrator, mounts on finisher, saves better part of 2 men's labor. Write for "Pocket Guide" describing the entire line.

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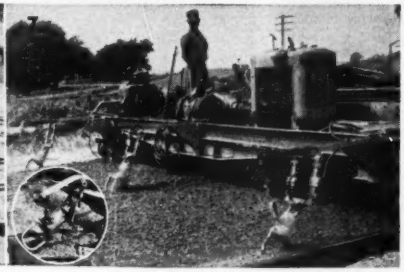
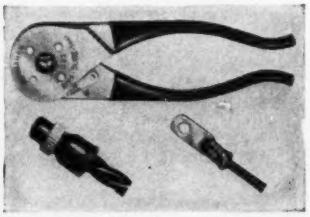


WELLPOINT PUMP—Small in size but big in capacity is the description given a new wellpoint pump. It will fit all sizes and types of wellpoint systems and has a special outlet that may be used in jetting. Power is furnished by a Wisconsin 4-hp gasoline engine. The unit is mounted on two pneumatic tires for easy portability.—**Complete Machinery & Equipment Co., Inc., 36-40 Eleventh St., Long Island City, New York, N. Y.**

BLACKTOP SEALING COMPOUND—Super Seal compound for asphalt pavements is processed from a special tar into an emulsion that becomes completely irreversible. It is said to provide protection against gasoline, oils, salt, and the elements. It imparts, the manufacturer states, a smooth, tough wear-resistant finish. Super Seal is said to eliminate peeling, tackiness under heat, weathering off, and discoloration.—**Troyer Driveway Service, 2157CM S. Park Ave., Buffalo 20, N. Y.**



WIRE CONNECTORS—Splice caps used with specially designed tool speeds pigtail splicing of electrical wires. The open-end splice caps are said to insure that wire insulation is flush with splice cap and that wires are always inserted to full depth. Two sizes of caps fill all requirements for wires from two #18 to three #8. Quickly applied snap-on insulators eliminate necessity for taping of joints. The pre-SURE-tool installs both sizes of splice caps and also Termend lugs. Crimping action of the tool provides maximum electrical and mechanical efficiency on both solid or stranded wires, or any combination of the two.—**Buchanan Electrical Products Corp., 1290 Central Ave., Hillside, N. J.**

WORLD-WIDE SALES AND SERVICE OF HYSTER TRACTOR EQUIPMENT BY MORE THAN 400 "CATERPILLAR" DEALERS

"Caterpillar" dealers around the globe are Hyster tractor equipment sales *and service* stations. They *sell* the right tool for the job. Their factory-trained mechanics *service* the equipment when required. They supply genuine Hyster parts from well equipped stocks.

Hyster has made tractor tools for use with "Caterpillar" track-type tractors for more than twenty years; will continue to design and build quality products for the world's toughest work assignments.

See your "Caterpillar" dealer for information about Hyster Tractor Equipment, or write for literature.

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- spring tandem suspension
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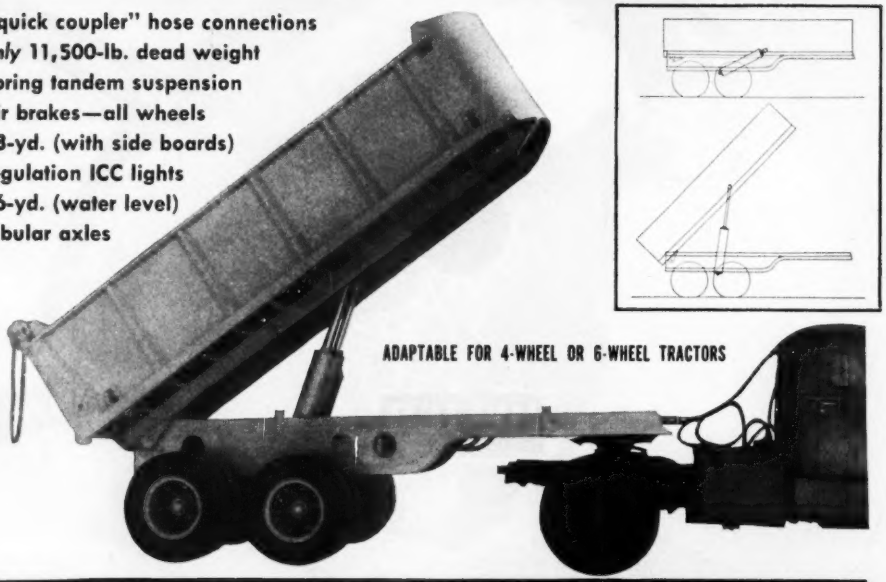
- tubular axles



ADAPTABLE FOR 4-WHEEL OR 6-WHEEL TRACTORS

A NEW IDEA IN DUMP SEMI-TRAILERS

TALBERT locates the twin hoists in the rear of the frame to permit *FORWARD ACTION*—for light-weight, easy lift design.

- the "forward action" of the hoists eliminates pushing against the anchor point of the body . . .
- the force of the hoist action is "over the wheels" . . .
- all thrust is on the center of the body . . .
- hoist location eliminates the heavy forward frame normally needed to support the hoists.

"FORWARD ACTION"

HYDRAULIC DUMP

TALBERT CONSTRUCTION EQUIPMENT COMPANY

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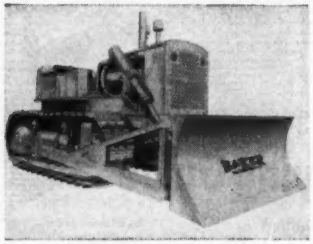
Manufacturers of TALBERT *Low-Bed Trailers*

SERVICE-UTILITY TRUCKS—Two trucks designed especially for use in building and construction service and repair work feature Aristocrat troubleshooter bodies. Parts bins are provided in horizontal compartments on either side of the body. Bins on the left side have removable dividers. Tool and material trays are built in. Body Model A-77 for 115-in. wheelbase L-110 and L-120 trucks measures 77 in. at the floor line. Body A-89 for 127-in. wheelbase models of the L-110 and L-120 series has an 89-in. floor-line measurement. Body A-96 for L-130 series, 134-in. wheelbase, and L-150 series, 130-in. wheelbase has an 89-in. floor measurement.—**International Harvester Co., Motor Truck Div., 180 N. Michigan Ave., Chicago 1, Ill.**

PROTECTIVE COATING—Coating based on Vinylite resins is said to combine the advantages of superior protection, durability, and economy. Applied by spraying, the coating is said to seal out moisture, resist mildew, and withstand unusual wear. It can be applied on wood, brick, concrete, rock board metals, and other surfaces.—**Plastic Coating Corp., P. O. Box 13127, Houston 19, Tex.**



TRACTOR ATTACHMENTS—Bulldozers, Gradebuilders and root rippers for the HD-20, HD-15 and HD-9 Allis-Chalmers tractors round out Baker's line of A-C matched equipment. All three attachments are available in hydraulic and cable-controlled models. Fingertip control is achieved through short linkage between blade control lever and hydraulic control valve. Features include direct lift, positive down-pressure and positive hydraulic hold.—**The Baker Mfg. Co., Springfield, Ill.**

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Quality Since 1890
CLAMSHELL **BUCKETS**

Excavating
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Capacities ¼ to 3 Yards

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A scientifically-designed double helix auger that:

★ Bores in any kind of soil, hardpan or decomposed rock

★ Bores clean, straight holes of the specified diameters—saves concrete

★ Saves power, minimizes wear and tear on your earth boring machine

★ Eliminates repair trips to shop... hard-facing expense

"You'd be surprised where the PENGO Auger will bore!"

"THE MOST PROFITABLE TOOL YOU EVER BOUGHT". Order a PENGO for your present machine... specify PENGO augers with your new machine.

Available in nine diameters to 36" (actual HOLE sizes) for use with all popular makes of earth boring machines.

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Heavy Duty TRAILERS

ON YOUR WAY WITHOUT DELAY...

KEEP your equipment earning money! For fast, safe job-to-job transportation get the Jahn Heavy Duty Trailer in the size and model that meets your needs.

JAHN TRAILER DIVISION

PRESSED STEEL CAR COMPANY, INC.
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PSC QUALITY PRODUCTS

THERE'S A JAHN TRAILER FOR EVERY HAULING NEED

Tandem Axle Trailers | Single Axle Tilt Trailers | Single Axle Trailers

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What they mean to you:

- The right equipment for each job
- Widest range of types and sizes, distributed nationally
- Less delay in securing equipment
- Safety-engineered ladders and scaffolds
- Longest total designing-manufacturing experience
- One source of supply for all types of scaffolds

"TROUBLE SAVER"® SCAFFOLDING

Two Famous Names—Your Buying Guide

"Tube-Lox" Scaffolding Steel or Aluminum

Safety Scaffolding Machines

Junior Swinging Scaffolds Steel or Aluminum

Midget Swinging Scaffolds

Ladders; Magnesium Ladders

Notice, on hundreds of jobs, scaffolds of all kinds identified as "Gold Medal" and "Trouble Saver" — famous trade names which will serve as your best buying guide. Submit your maintenance and construction scaffolding problems to experienced representatives from the branch or distributor nearest you. Consult your telephone "Red Book."

Scaffolds for Any Purpose — Any Place — Any Time

Sectional Steel Scaffolding

Ladder Jacks; Scaffold Brackets

Adjustable Steel Trestles

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Steel or Aluminum Ladder Scaffolds or Rolling Scaffolds

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for Greater Safety...Efficiency...Economy

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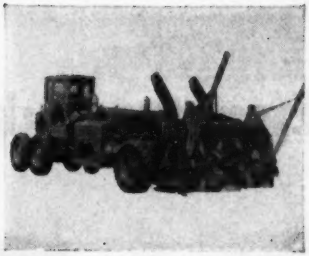
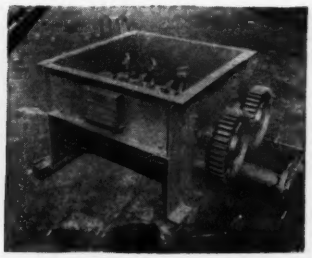
SEE YOUR CLASSIFIED TELEPHONE DIRECTORY FOR NEAREST OFFICE

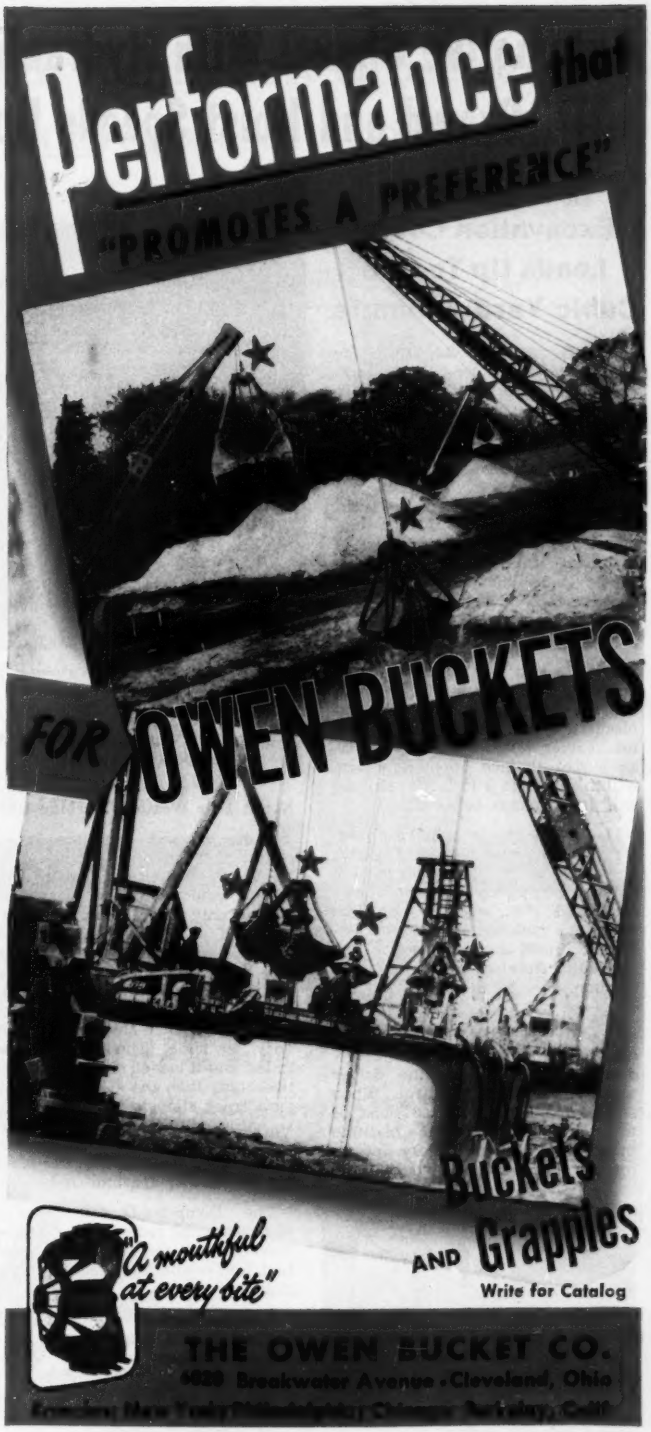


GRADER-MOUNTED SNOW PLOW—Sno-Flyr rotary plows are now readily adaptable to mounting on motor graders. In addition to providing year-round service for the grader, the plow employs an auxiliary engine that can be used when snow plowing is over as a grader replacement, power unit for generators and air compressors and other engine applications. The plow is available for: Caterpillar graders with serial numbers from 9K-2911 to 9K-9999, 7T1 and up, 8T1 and up, and Allis-Chalmers AD-4 graders.—**Wm. Bros Boiler & Mfg. Co., 1057 Tenth Ave., S. E. Minneapolis 14, Minn.**

TWO-CYLINDER 30-HP DIESEL—Type 4FS2 two-cylinder diesel is rated 20 to 30 hp within an operating-speed range of 1,200 to 1,800 rpm. It features low operating cost and heavy-duty construction, and is a self-contained ready-to-operate unit. Electric or manual starting is available. Engine speed is controlled by adjustment of the governor.—**Nordberg Mfg. Co., Chicago & Oklahoma Aves., Milwaukee 7, Wis.**



TWIN-SHAFT ASPHALT MIXER—Improved principle of attaching sectionalized lining in twin-shaft mixer results in easier and more economical replacements. Lining surface, instead of being one solid piece, consists of several smaller sections, bolted to the heavy welded steel body from the outside. No holes or bolts extend through to the wearing surface. Roller bearings are employed to reduce the horsepower required for operation. Machine is available in two models, and is adaptable to all makes of asphalt-mixing plants. — **Standard Steel Corp., 5001 Boyle Ave., Los Angeles 58, Calif.**



Automotive Shovel With Hydraulic Crowd and Hoist Speeds Up Excavation Work

Unit Reduces Excavation Costs; Loads Up To One Cubic Yard A Minute

MOVING SHOVEL LOADERS to and from jobs is one of the most expensive unproductive costs in excavation work. Contractors lose hundreds of hours and spend thousands of dollars annually moving this equipment. Developments since the war show that contractors can be relieved greatly of these costs. One of the most successful developments has been the manufacture of the rubber-tired Dempster-Diggster shovel loader that travels at truck speeds.

THE DEMPSTER-DIGGSTER is shown here digging out a 15 foot bank of hard chert. The power crowd permits bucket to keep digging until loaded . . . no digging with wheels.

Digs Through 15 Foot Bank

Construction men have found that on big jobs the Dempster-Diggster has no equal for working in tight places and for freeing big shovels for heavier work. The Diggster has an 8 foot 10 inch crowding reach, will dig through a 15 foot bank, and will dig 15 inches below grade.

Manufacturer's tests and contractor's reports show that the Diggster will load up to one cubic yard a minute. This speed in excavation is accounted for, mainly, by the Diggster's exclusive independent hydraulic crowd and hoist action, the hydraulic steering, and wheel-type traction.

The power crowd permits bucket to keep digging until loaded . . . no digging with wheels. The hydraulic steering gives the driver sensitive, finger-tip control. When accelerated, a one-handed twist of the steering wheel puts the machine in any desired position. By operating on rubber-tired wheels, the Diggster, of course, can move at the fastest possible speed.

ENCLOSED STEEL CAB protects operator against inclement weather.

Not A Fair Weather Machine Only

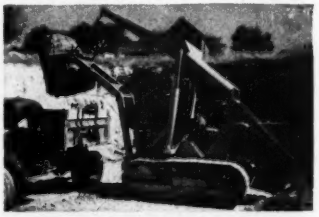
Under adverse conditions on a state highway near Charleston, W. Va., recently, the Diggster loaded 150 cubic yards of sticky blue clay in only three hours. The work consisted of cleaning up slides on 14 foot embankments on both sides of a concrete road. The weather was not cooperative, inasmuch as considerable rain fell the night before. But the Diggster showed no tendency to slide. The job foreman stated that it loaded more material in two hours than the ⅜ and ½ cubic yard truck shovels normally did in an entire day. This and many other operations in inclement weather have proved that the Diggster is not a fair weather machine only.

The Dempster-Diggster has a 15 foot turning radius, is 20 feet long when bucket is in traveling position, and is nine feet and six inches in height.

Four standard interchangeable buckets of two types are available. Digging buckets with four bottom teeth in 1 and 1¼ cubic yard (heaped) capacities. Materials handling buckets in 1½ and 2 cubic yard (struck) capacities.

Crawler Traction Available

For fast, efficient operation in difficult terrain, the Diggster is available with crawler-type traction.



Complete information and prices may be obtained by writing the manufacturer, Dempster Brothers, Inc., Knoxville, Tenn.

DEMPSTER DIGGSTER

DEMPSTER BROTHERS
311 SHEA BLDG.
KNOXVILLE 17 TENNESSEE

A Traylor TY Reduction Crusher produces better aggregate . . . consistently

NO LIFTING OR CHURNING

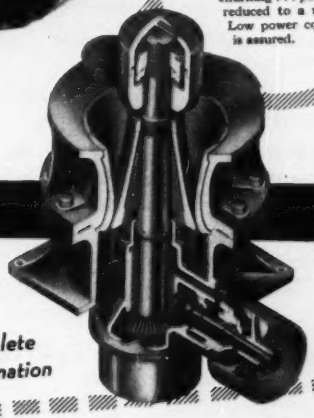
Lifting and churning of material in the crushing chamber is eliminated by a Traylor TY's curved concaves and bell head. Waste fines are reduced to a minimum . . . a uniform cubical product is assured.

NO PACKING OR CHOKING

A Traylor TY's curved crushing surfaces eliminate choking and packing. Each succeeding zone in the crushing chamber has greater capacity than the zone before it. A dependable, steady supply of uniform, cubical aggregate is assured.

LOW POWER COSTS

By elimination of choking and packing . . . lifting and churning . . . power waste is reduced to a minimum. Low power cost per ton is assured.



A Traylor TY Reduction Crusher is *your* best assurance of a steady, dependable supply of uniform, cubical aggregate. Aggregate that will meet the most severe engineering requirements day after day. If you are producing stone that must meet strict specifications, put a Traylor TY Reduction Crusher on the job. Mail the coupon for free bulletin that gives complete information . . . size . . . and capacities . . . to help you select a Traylor TY to meet your needs.

Send For Complete Information

TRAYLOR ENGINEERING & MANUFACTURING CO.
309 MILL ST., ALLENTOWN, PA.

Looks like a Traylor TY Reduction Crusher is just what I need.

*Name*_____

*Company*_____

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Rotary Kilns, Coolers and Dryers · Grinding Mills
Jaw, Reduction and Gyratory Crushers · Crushing Rolls

A "TRAYLOR" LEADS TO GREATER PROFITS

GUTS

When two-legged people have guts, they finish the fight and do the job.

Real guts—that's what the world admires—man or machine.

You can't define what makes guts in a man, but you can "analyze" the fighting, working, dogged innards of the Champ. So let's put the X-ray on the TD-24:

Drawbar Horsepower: 148 working horsepower delivered at the drawbar in official tests.

Synchromesh Transmission: you "shift on-the-go," with eight speeds forward, eight reverse for faster time cycles with more pay dirt per cycle.

Instant Speed Change: up or down one speed without declutching.

Planet Power Steering: all turns are easier . . . pivot turns, feathered turns, turns with power on both tracks.

Reserve Torque: gives the Champ the lugging ability to fight through temporary overloads.

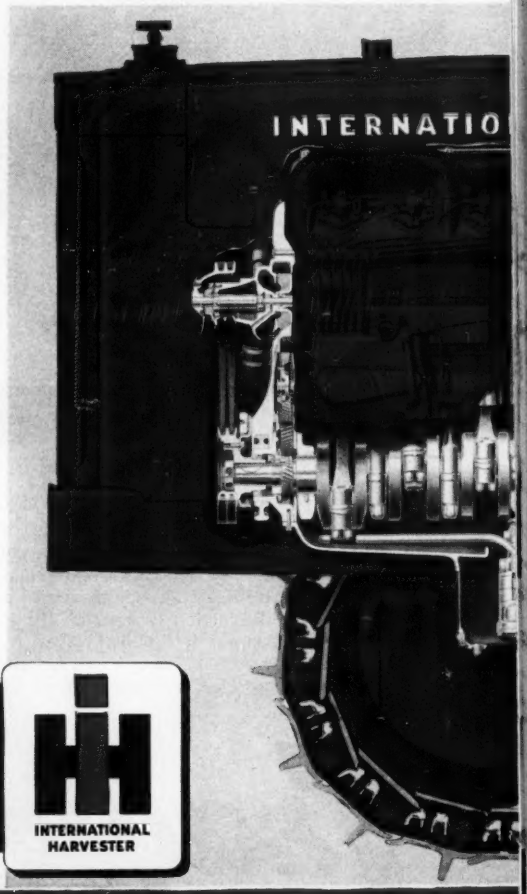
Easy Steering: finger-tip hydraulic controls.

All-Weather Starting: push-button, gasoline-conversion starting—an International exclusive—gets you on the job fast.

More Work: the TD-24 is doing more work—with more speed and more lugging ability—than any other crawler tractor on the market.

Look it over. Then ask your International Industrial Distributor to show you what it can do for you. You'll be a TD-24 man from then on in.

INTERNATIONAL HARVESTER COMPANY
CHICAGO 1, ILLINOIS



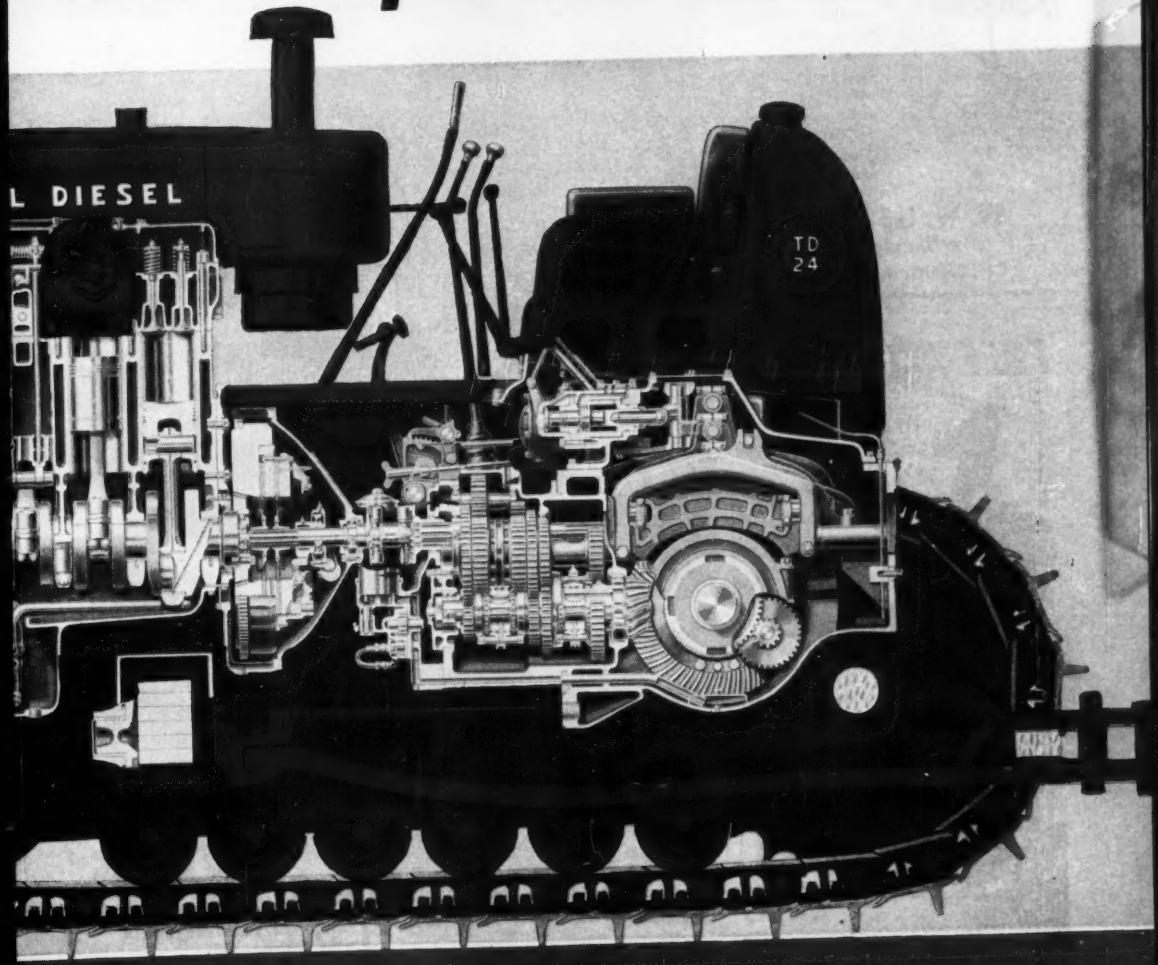
POWER THAT PAYS

INTERNATIONAL

INTERNATIONAL HARVESTER

OF A CHAMP

inside story of the TD 24



TILLEY

FLOODLIGHT PROJECTOR

Burns 40 hours on 6 pints of Kerosene

This Model F. L. 6 Floodlight is shown complete with short stand—Weighs 27 lbs. Overall height 26 inches. $65.00 F. O. B. CHICAGO.

- A self-contained unit with no cables — entirely independent of batteries, generators, and the like, which makes it more mobile. Wind and rain proof.
- The TILLEY Floodlight Projector gives a white light of 5000 reflected candle power. It is just the thing for night construction work and for emergencies when power is not available. *For complete details we suggest you write*

W. W. LEE & SON
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CHICAGO 4, ILLINOIS

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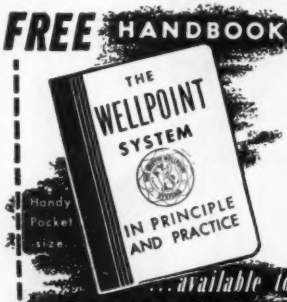

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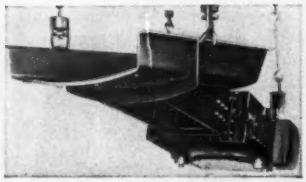
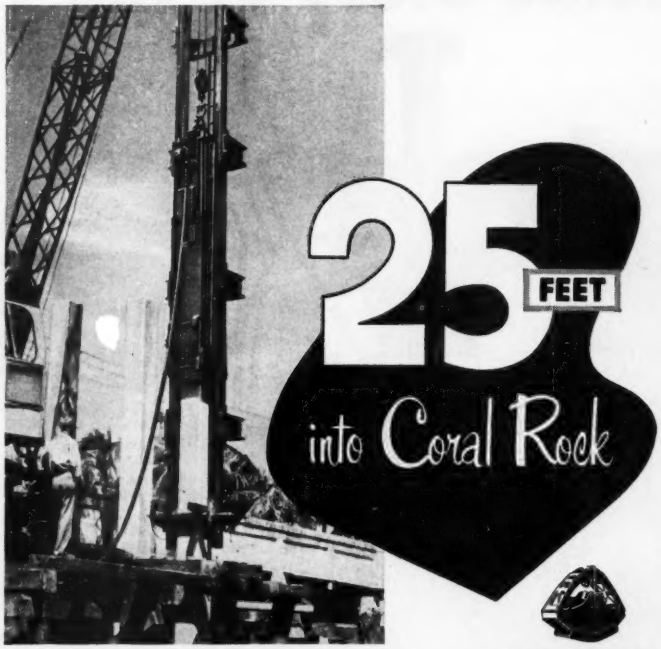


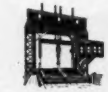
VIBRATORY FEEDER — Leaf springs, armature, and core of Vibra-Flow feeder are covered by gasket-sealed plates bolted to magnet casting resulting in dust-tight design. Enclosing these parts provides protection against clogging by excessive supply hopper spillage or heavy dust conditions. Feed rates range up to hundreds of tons per hour when handling dry, damp, hot, cold, fine or coarse materials.—**Syntron Co., 500 Lexington Ave., Homer City, Pa.**

CONCRETE FINISHING MATERIAL— Speed Finish is designed for use in place of rubbing. It is said to develop a mechanical and chemical bond with the original concrete, and to improve the appearance and durability of the surface. It acts as a barrier against the elements, abrasion, and spalling, and does not destroy any properties of the concrete, the manufacturer states.—**Irvington Form & Tank Corp., Dept. CME-S, 20 Vesey St., New York 7, N. Y.**



GRAB BUCKETS

COAL TOWERS


TRANSFER BRIDGES

To drive 35-foot piles, 16 inches square, 25 feet into coral rock called for a highly dependable hammer. That is why Powell Bros., the contractors on this Florida State Highway project at Fort Lauderdale, used a McKiernan-Terry S-5 Single-Acting Pile Hammer. •This McKiernan-Terry Single-Acting Hammer strikes with a 16,250 foot-pound blow. It is of a highly specialized design for handling heavy mass piles such as concrete, and for driving into dense, difficult soils. • 17 sizes of hammers and extractors are available in the complete McKiernan-Terry line. Write for bulletin giving all the facts.

McKIERNAN TERRY

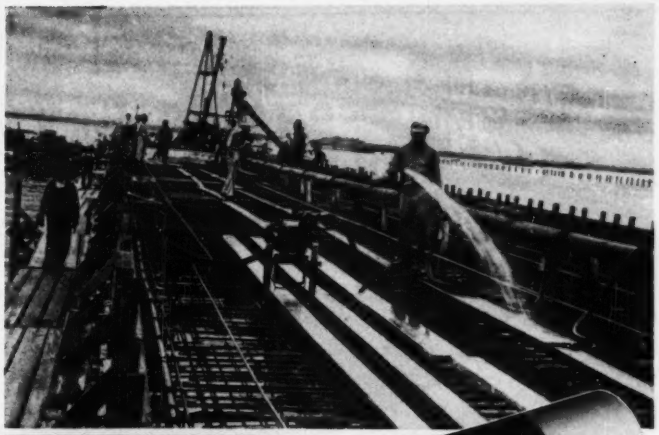
McKIERNAN-TERRY CORPORATION, MANUFACTURING ENGINEERS
14 PARK ROW, NEW YORK 7, N. Y.
Plants: Harrison, N. J., Dover, N. J.

MK 280

JEEP-MOUNTED DRILL—Penndrill Jeep is rated at 450 ft of NX hole (2⅛-in. core) or up to 1,000 ft of EX hole (⅞-in. core). Recommended applications include foundation test borings, grout-hole drilling, and other shallow-hole requirements. Power for the diamond core drill is provided by the Jeep's take-off. Unit is available with hydraulic or screw-feed swivelheads. An aluminum mast is available as optional equipment. Drill is easily detached permitting general use of the Jeep.—**Pennsylvania Driling Co., Inc., 1201 Chartiers Ave., Pittsburgh 20, Pa.**

MASONRY WATERPROOFER—Liquid compound is said to effectively waterproof concrete, brick, plaster, stucco, stone, cement, tile, ceramic and other masonry construction and surfaces. It is also effective on shingles, wood, and other materials. Coverage of Lipton All-Seal waterproofing is 200 to 350 sq ft/gal, and it can be applied by brush or spray. It is transparent and leaves no after stain.—**Progressive Enterprises, 1001 N. Vermont Ave., Los Angeles 27, Calif.**

STAPLING HAMMER—High-speed tacking and light nailing jobs are simplified with the H2B stapling hammer. Over twenty improvements in design and construction are said to have been incorporated in this new model. The H2B uses staples of 0.050x0.019 wire, available in several leg lengths. The hammer is one-hand operated.—**Bostitch, 1063 Mechanic St., Westerly, R. I.**



STRONGER Where Strain is Greatest!

STYLE R-35

U. S. Patent No. 1948410

"NEWTYPE" SUCTION HOSE

A GOODALL *"Standard of Quality"* PRODUCT FOR CONTRACTORS

Special reinforced ends give added strength and resistance to flexing wear back of the couplings, and provide a sturdier, more durable section under the clamps. Ends are colored in bright red for easy identification.

Kinkproof construction assures full-capacity bore under suction and discharge, always . . . the hose will not buckle or collapse. If accidentally crushed by heavy equipment, it can be rounded into shape again with mallet or hammer.

Extreme flexibility, with comparative lightness in weight, makes "NEWTYPE" easy to handle, even in longest lengths.

Inseparable bonding of tube, carcass and cover, by patented process, insures extra long service life under severest working conditions.

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Made in 1" to 1½" I. D. in maximum lengths of 100 feet, and 2" to 4" I. D. in maximum lengths of 50 feet.

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Cobey HYDRA-POWER End Gate

Makes Truck Loading and Unloading Easy!

Quickly Pays for Itself!

Reduces—

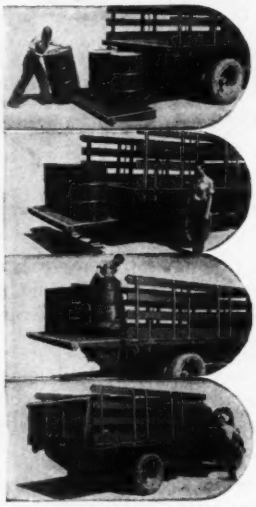
LABOR COSTS, EMPLOYEE ACCIDENTS, and CARGO DAMAGE

LIFTS and holds a real load—3,000 lbs. maximum.

SPEEDY LIFT—truck motor does the hard work.

STOPS automatically at truck floor level.

RUGGED end gate quickly closed by hydraulic power.



The Cobey Hydra-Power End Gate is lowered, raised, and closed by hydraulic power—operating from truck motor. Only ONE hydraulic cylinder required. Gate rides level regardless of load, and may be stopped at any point. For any model truck with suitable body type. End gates made in 4 sizes—with Built-in Ramp or Box-Type with Ramp Attachment.

The Cobey Hydra-Power End Gate is a necessity to contractors—saves valuable time in moving supplies and equipment from job to job. Write for complete data.

Designed, built, and guaranteed by

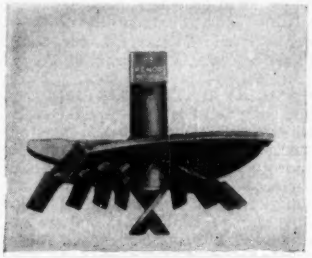
THE PERFECTION STEEL BODY CO.

Galion, Ohio, U.S.A.

PERFECTION STAKE and DUMP BODIES HYDRAULIC HOISTS

FOR ANY TRUCK STANDARD or SPECIAL UNITS IN ALL SIZES • FOR ANY USE

PRESS - ON HOSE COUPLING — Press-Lock hydraulic hose coupling employs as its anchoring principle the fact that rubber in mass form, while not compressible, can be displaced under pressure. The coupling consists of three parts—the corrugated stem, sleeve extending full length of the stem, and locking ring between collar and anchoring flange. Attaching the coupling unites the sleeve, ring, and nipple into a solid unit, and displaces the entire hose wall. Made of steel, coupling is available in sizes to fit 3/16- to 2-in. inside-diameter hose. — **Mulconroy Co., 5321 Jefferson St., Philadelphia 31, Pa.**



TWIN-HELIX EARTH AUGER— Pengo earth auger is designed to fit, through special adapters, all makes of power-driven earth-boring machines. These augers are produced in nine sizes for hole diameters to 36 in. Twin-helix design eliminates back thrust against side of hole, making it possible to drill with less caving in of sandy soil. Each half helix is equipped with a shank plate, each of which is provided with replaceable cutting points of abrasion-resistant alloy steel. The Pengo is said to dig in hardpan, decomposed rock, ordinary ground, and some kinds of caliche and sandstone. **—Petersen Engineering Co., 4126 Twenty-Sixth St., San Francisco, Calif.**

COLD GALVANIZING—New method of cold galvanizing uses Zinkrich compound to create an electro-chemical union allowing zinc to galvanize to the base metal's (iron or steel) surface. Zinkrich can be applied by brush, electric spray gun, or cold dip without special equipment. When applied on to adhering rust, it is said to produce a non-flaking coating that arrests further rust and prevents rust creep. **—Chase Chemical Corp., 40 W. 29th St., New York 1, N. Y.**

Heavy jobs off-the-road... heavy equipment over-the-road

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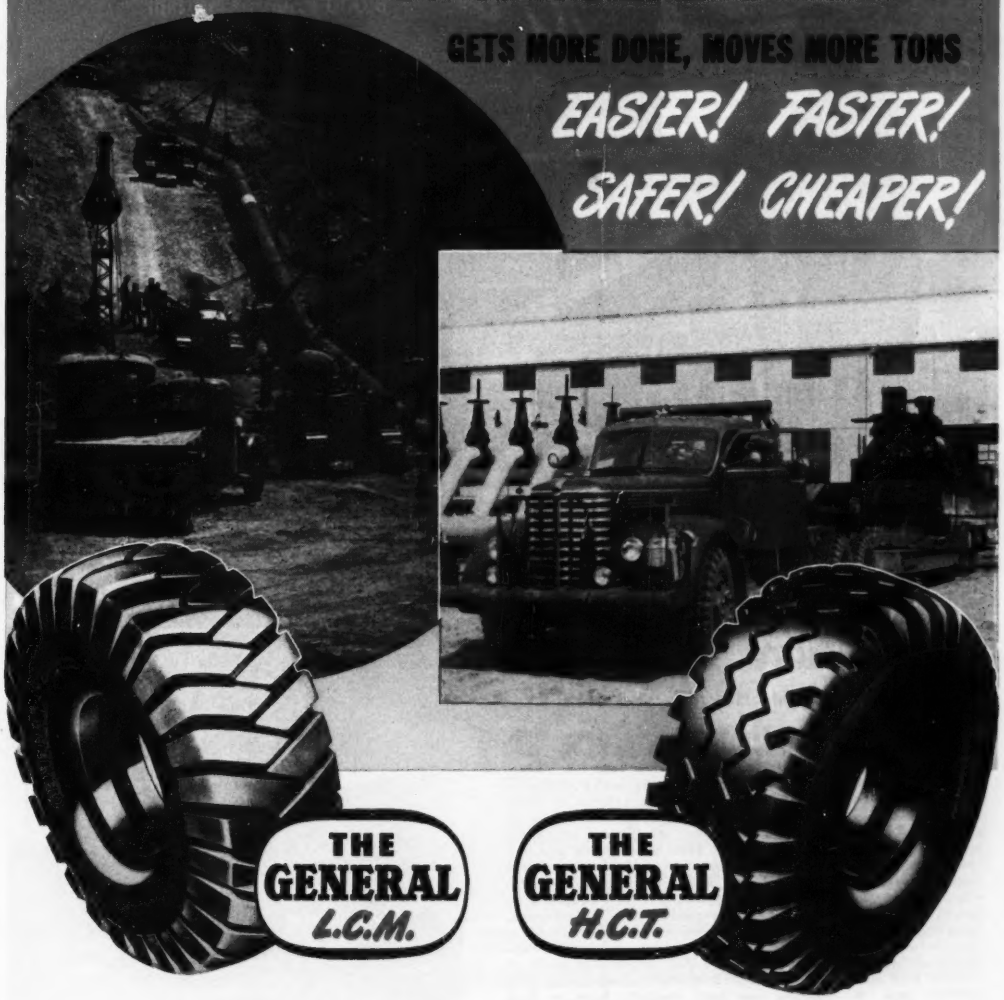
GETS MORE DONE, MOVES MORE TONS

EASIER! FASTER! SAFER! CHEAPER!



Here's General's dual-purpose team. The General H. C. T. with more, safe traction to go in and get the load . . . and take it long distances over the highway. The General L. C. M. to work 80% off-the-highway. Massive, deep lugs develop extra traction under heavy loads. Let your local General Tire Distributor show you how you can make more profit with this Top-Quality dual-purpose Truck Tire Team.

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. . . An old respected name on a

CLYDE Brand New!

8,000 Pound Line Pull

HOIST

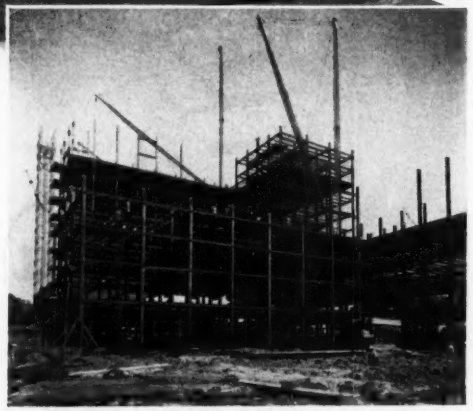
with FIELD-TESTED FEATURES for ULTRA PERFORMANCE!

One of the 2 Clyde Frame 5 hoists operating Clyde Steel erectors derricks on Claiborne Towers, New Orleans.

17 Quality Features . . .

On This New, Frame-5 Hoist

Two-piece, internal expanding frictions • Friction bands easily replaced without removing drum • All levers conveniently banked to operator's comfortable seat • Large diameter brakes allow operator to "toe" the brake with full load control • Removable intermediate shaft • Ball bearing mounted shafts throughout for greater line pull with less maintenance and more economy • Chain adjustable without removing chain guard • Steel side frames and bed give more strength with less weight • Full view of drums from operator's seat • Lever bank accommodates additional levers for third drum or swinger • Proper size drums to give most practical rope service • Rolled steel, hook-type pawls, manually engaged, weight released • Totally enclosed automatic brake, standard on electric, optional on gasoline or diesel • 8,000 pound line pulls at various high speeds • Improved oil-tight chain guard with positive seal • Handles one yard concrete buck at high speed • Bull wheel swinger that allows unobstructed lead of lines from drum to bull wheel.



HOISTS - DERRICKS - WHIRLEYS - HANDI-CRANES - ROLLERS
BUILDERS TOWERS - CAR PULLERS -

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On a MODERN HOIST . .

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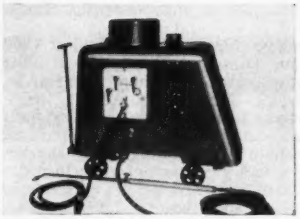
DULUTH 1, MINN

Subsidiary of Barium Steel Corp.



COMBINATION CLEANER, FLUSHER—Model JO Hypressure Jenny is combination steam cleaner and automotive cooling-system flusher. The oil-fired electric-motor-driven steam cleaner operates at 80- to 120-lb pressure, and has 90-gal per hr water capacity. Used as cleaner it reverse flushes complete cooling systems by employing heat, chemical, sudden but safe temperature changes, and a strong air blast.—**Homestead Valve Mfg. Co., Hypressure Jenny Div., P. O. Box 843, Coraopolis, Pa.**

RAW MATERIAL CALCULATOR—Metal rod and flat stock requirements can be determined directly from blue prints with this slide-rule-type calculator. All markings on the Vinylite calculator are covered with transparent piece of same material to prevent wear. Measuring 2x11-in., device computes information needed for rod and flat stock in various shapes and sizes and in any length. —**H. R. Potter Co., P. O. Box 318, Montclair, N. J.**

CONCRETE BUCKET—High-pressure air-supply tank and control valves are an integral part of the new Gar-Bro concrete bucket. Featured on the air-operated Model A are pull-chain controlled valves that eliminate hose, connectors and air supply at the dumping location. Double clamshell gates are grout tight and non-clogging, and have center discharge and dump straight down. They release any portion up to a full load, and can be remotely controlled.—**Gar-Bro Mfg. Co., 2416 E. 16th St., Los Angeles, Calif.**

Am I Glad We Have STERLINGS!

At a time when wheelbarrows are scarce, it certainly feels good to have a supply of sturdy Sterling Barrows on hand. Sterlings are so ruggedly constructed, they seem to last forever. In the present emergency, many Sterlings are working overtime, taking hard punishment and coming back for more . . . again proving . . .
IT PAYS TO BUY THE BEST.

(Above) Model D3½S Maximum Capacity 3½ cu. ft. 18 gauge tray, all welded, no rivets, double lapped at corners. Steel channel legs. V-shaped front braces and brace support.

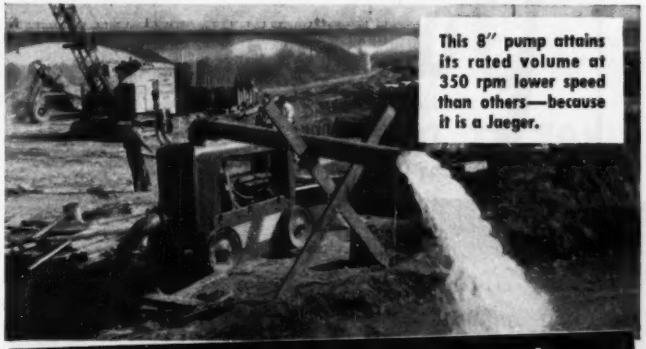
(Right) Model C5W Maximum Capacity 5 cu. ft. 16 gauge tray, all welded, no rivets, double lapped at corners. Heavy-duty malleable wheel guard.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Look for this Mark of STERLING Quality

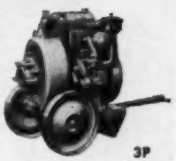
Sterling S WHEELBARROWS

2100 gallons every 1150 revolutions



JAEGER pumps pull stronger, pump longer

Because Jaeger dewatering pumps are built oversize, to produce full rated volume at easier speeds, they also hold more priming water and are subject to less abrasive wear. Combined with double priming action and positively lubricated seal (Jaeger patents) they insure fast, sure priming without vapor lock on the toughest pulls, sustained efficiency on non-stop pumping, and thousands of extra hours of service from both pumps and engines.



3P
Others 1½" to 10"

See your Jaeger distributor or send for Catalog P-10.

THE JAEGER MACHINE CO. 800 Dublin Ave., Columbus 16, Ohio

COMPRESSORS • MIXERS • HOISTS • TOWERS • PAVING MACHINERY

PORTABLE LIGHTING SYSTEM—Low-voltage unit is driven by compressed air. The Joy-Lite will develop an output of 250 to 280 watts with air consumption not exceeding 25 cfm. Generator is mounted in a steel box designed to afford protection against dirt and dripping water. Lamps have tripod swivel bases which can be used as column clamps and hooks which serve as hangers. The unit weighs 48 lb.—**Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.**

VAPOR STEAM CLEANER—Heavy-duty machine features fully automatic safety-protected system for one-man operation. Turning on switch generates spark that ignites the burner. From this point on, manufacturer states, fully automatic controls maintain operation at peak level. Operating pressure is generated within 90 sec. No premixing of cleaning compound is necessary. Burner is designed to operate on any fuel—kerosene, No. 1 and No. 2 fuel oil, light diesel oil, and crankcase, transmission, and rear-axle drainings—without adjustments of any kind. The General is available in stationary or portable models of 100- or 200-gal capacities.—**General Equipment Div., Sterod Mfg. Co., 444 Frelinghuysen Ave., Newark 5, N. J.**

IMPROVED DROP AXLE—Distance between spring center and track line on the Series 7129 drop axles has been reduced to less than 8 in. Underslung springs augment the axle's low center of gravity. The 4-in. drop made possible provides increased protection against overturning and injury to personnel and equipment. Spring pad eliminates possibility of spring shift. The Caravan axle is capable of supporting loads of 4,000 or 5,000 lb, depending upon beam diameter. Brake flange is machined to receive 12-in. mechanical or electric brakes.—**United Mfg. Co., 47 W. Interstate St., Bedford, Ohio.**

TRUCK-MOUNTED EXCAVATOR—Model 40 crane-excavator is rated at 12½ tons. It converts to all crane and shovel attachments. Swing speed is 6.4 rpm. Equalizing beam-type suspension and a locking third differential make possible heavy, off-the-road work. An auxiliary transmission provides ten forward and two reverse speeds. The Model 40 lifts, booms, and swings either simultaneously or independently. Standard power unit is a 6-cyl gasoline engine that develops 105 hp at 3,200 rpm. Other gasoline or diesel units are available. Other features include: Cab design permits inside access to all deck machinery; unit replacement of all subassemblies; built-in counterweight to shorten rear-end clearance of cab; 16-in.-dia drums for increased life of the wire rope; and anti-friction bearings throughout. Standard power unit for the upper works is a 62-hp 6-cyl gasoline engine—with optional gasoline or diesel engines available.—**Wayne Crane Div., American Steel Dredge Co., Inc., Fort Wayne, Ind.**

TOWED-TRAILER AXLE — Self-sprung towed-trailer axle unit is extremely simple in design. It consists of two helical torsion-springs around a forged steel axle member with offset wheel spindles and two bearing brackets for trailer body support. Installation requires four

(Continued on page 124)

Parmanco

HI-SPEED HORIZONTAL

DRILLS

New Traction Drive with Forward and Reverse

THIS UNIT IS DELIVERING

6-inch shot-holes

READY FOR LOADING

at better than

TWO FEET A MINUTE!!

The new Parmanco Hi-Speed Horizontal Drill is completely redesigned around a 40 h. p. engine with four drilling speeds which, in field tests, has cut one-third off the footage drilling time — a cost-per-drilling-foot saving that we are passing on to the strip mine operator and contractor at no increase in our price. In addition, the drill is equipped with a starter and generator, dual type front wheels, truck type rear axle with mechanical brakes and a traction drive with both forward and reverse.

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FREE Send me without cost or obligation, the interesting new leaflet giving full facts on the "Power Pilot," plus specification data on the NEW Ford Trucks for '51 indicated below:

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LIGHT MODELS ☐ EXTRA HEAVY DUTY MODELS ☐

Name _____
(Please print plainly)

Address _____

City _____ Zone _____ State _____

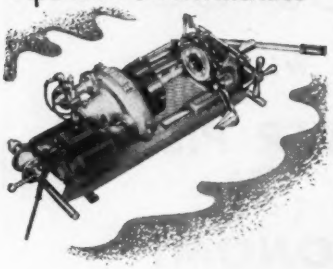
(Continued from page 122)

bolts. The axles can be installed singly or in tandem. Design permits use of conventional wheels, hubs, roller bearings, and brakes. The ASF-Linco axles are said to provide an easy ride under all conditions and to permit heavier loads without bottoming. The trailer remains level under unequal loading since an off-center load brings both sides down an equal amount.—**American Steel Foundries, 410 N. Michigan Ave., Chicago 11, Ill.**

KEROSENE-BURNING FLOOD-LIGHT—British-made Tilley flood-light projector is available. It uses kerosene as fuel hence is self-contained and completely portable. Manufacturer claims that it provides 5,000 reflected candlepower of white light, and will burn for 40 hr on 6 pt of kerosene. Weight, when mounted on the short stand, is 27 lb; height, 26 in.—**U. S. A. distributor: W. W. Lee & Son, 20 E. Jackson Blvd., Chicago 4, Ill.**

• LIGHTWEIGHT
• LOW-PRICED
• EASY-TO-MOVE

the New Beaver Model-E Pipe and Bolt Machine



The new low-priced, lightweight Beaver Model "E" is a "junior edition" of the heavy-duty Beaver Model A—which has, for the past 20 years, been the recognized leader in the field of portable pipe and bolt machines.

The Model "E" uses the same dieheads—the same dies—the same patented interchangeable wheel-and-roller or knife cutoff devices—the same reamer arm and cone—as the Models A and B. This will be a great advantage to thousands of shops now equipped with the Beaver Model A or B because it eliminates the necessity of carrying in stock duplicate dies and parts—thereby preventing endless confusion and needless expense. And remember, there are 195 different kinds and sizes of dies instantly available for Models A, B or E.

Although designed primarily for hardware stores and small piping contractors, BIG contractors will find the new Model "E" useful on jobs requiring extreme portability.

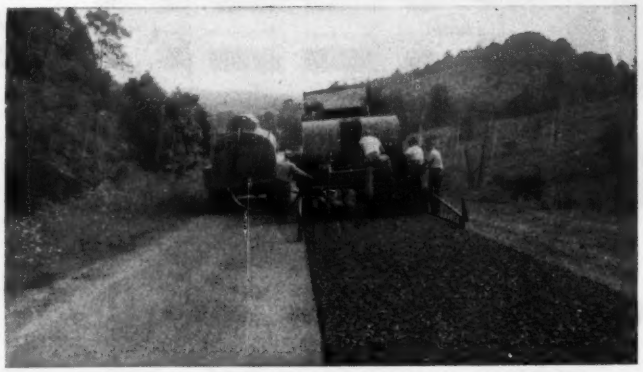
A pipe machine is no better than the service back of it and our 50 years of experience in this field, and our reputation for high quality and friendly service, is your best guarantee of complete satisfaction.

WRITE FOR BULLETIN E

BEAVER PIPE TOOLS

228-300 DANA AVE. • WARREN, OHIO, U.S.A.

Moto-Paver
SPEEDS THE JOB
CUTS THE COST



No other machine or method produces comparable results at comparable costs

The *Moto-Paver* provides a highly efficient method of paving and resurfacing roads and streets. With this self-propelled machine, the *mixing* and *laying* of a cold bituminous mat is accomplished in one continuous operation. Uniformity of mix and a smooth riding surface are assured. The *Moto-Paver* has been successfully operated using gravel, stone or slag aggregates, and with most types of emulsions including RC, MC and SC asphalt and tars. Its mobility, together with the small operating crew and the minimum amount of auxiliary equipment required, make the *Moto-Paver* ideal for out-of-the-way jobs and maintenance, as well as for new construction. Bulletin MP-49 gives complete information.

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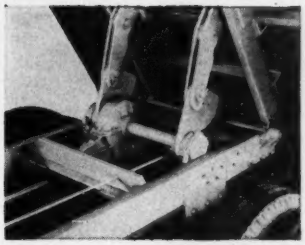
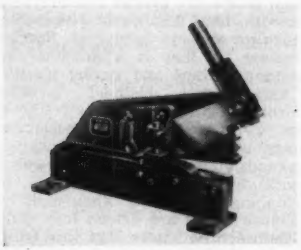


MECHANICAL DUMP HOIST—Capacities of the Dube mechanical dump-truck hoist range from light and medium-duty units to model designed for trucks having gross vehicle weight of 23,000 to 28,000 lb. Entirely mechanical in operation, power is obtained from the truck's take-off. It features positive power-down and power-up action; and 60-deg dumping angle. Hoist is self-locking in any dumping angle.—**Detroit Mechanical Hoist Corp., 3502 W. Fort St., Detroit 16, Mich.**

CENTRAL-PLANT MIXER—Supremix mixer is installed as an integral part of a central-plant structure eliminating elevated foundations or separate mixer platforms. Hydraulic-tilting arrangement permits mixer to be located low, thus saving headroom while allowing sufficient height for direct discharge into delivery equipment. A separate power source is required. The Supremix plant allows two lines of traffic—one for central mixing; the other for dry batching—using the same scale and batching facilities. Operator located in front of the mixer where he can see all functions.—**Supremix, Inc., Affiliate of Gene Olsen Corp., Adrian, Mich.**



HAND-LEVER SLITTING SHEARS—Frame of the Samson shears is offset to enable the machine to cut sheet or plate of any length or width. Available in five models, capacities range from 1/8-in. to 5/16-in. mild-steel plate. Shears up to 3/16-in. capacity have a toggle action; larger models have a gear action. All shears have holddowns adjustable for the thickness of the material being cut. The machines will cut flats and rounds.—**Julius Blum & Co., Inc., 532 W. 22nd St., New York 11, N. Y.**

HAISS Material Handling

BUCKET LOADERS

FOUR MODELS
Load 3 to 8 Yards per min.
SELF-PROPELLED
SELF-FEEDING

For loading: sand, gravel, stone, topsoil, coal, snow and similar materials. One man operation, wheel or crawler mounted. Furnished with swivel chute or with swivel belt conveyor.

Special new features include: Sealed anti-friction bearings on head and tail shafts, two or four wheel drive, hydraulic raising and lowering, manganese or roller chain.

HAISS CONVEYORS
CAR UNLOADERS

FLAT and TROUGH BELT CONVEYORS
For handling all types of loose or package materials. Mounted on "V" or most truck with swivel wheels or for permanent installation.

UNDERCAR UNLOADERS
Designed and built especially for loading sand, gravel, and crushed stone. Combination belt and positive chain drive. Capacity up to 5 tons per minute. Ask for Bulletin No. 501.

SECTIONAL CONVEYORS
Channel or Lattice Frame construction. Made in easily assembled standard sections for permanent or portable installation. All sizes and capacities available for handling all types of aggregates as well as bagged or packaged materials.

For further information write, 'phone or wire. Experienced Haiss Representatives are located in all principal cities.

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...About CONTINENTAL RED SEAL POWER

When you're in the market for internal combustion power, look into the experience of other users, checking as near the actual job level as you can. Ask the man who runs the machine, in any of a dozen fields, and the answer will be pretty much the same: Continental Red Seals deliver dependable, low-cost power. They require little attention. They're mighty easy on fuel. This uniformly high esteem results from *specialization*. There's a Continental Red Seal model engineered to meet the needs of virtually every job, in industry, construction, transportation, and on the farm. There's a Red Seal engine or power unit built expressly for YOUR application. Get it, and you'll have the one best power source for your job, because it's built to do one thing and do it well.

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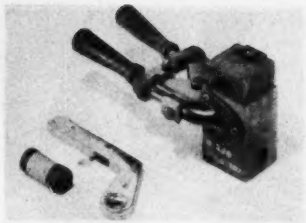
Continental Motors Corporation
MUSKEGON, MICHIGAN



CABLE SPLICER—Erico process is method of welding copper to copper without any outside source of heat. It can be used to splice welding cable, quick connectors, and terminal lugs. Advantages claimed include: Joint is not damaged by excessive overload; greater current-carrying capacity because it is a fusion weld of 98% copper and has a 50% greater cross section than the cable; and weld is made in less than one minute. **—Erico Products, Inc., 2070 E. 61st Place, Cleveland 3, Ohio.**

NEW PLASTER AGGREGATE—Zonolite finish aggregate when used in combination with unfibered gypsum produces a plaster that provides smooth, hard finish over either vermiculite or sand base coat. Special feature is that it eliminates the mixing of lime and gaging plaster. Characteristics claimed include: Strongest possible bond as result of its gypsum-to-gypsum application; easy proportioning; easy working; spreads quickly to allow long sweeps with trowel; and is resistant to chipping or marring when nails or picture hooks are driven into wall. Manufacturer states that this finish aggregate has undergone extensive 3-year field test.**—Zonolite Co., 135 S. LaSalle St., Chicago 3, Ill.**

LIGHTWEIGHT 6-IN. SAW—High speed and dependability are features of W65 electric safety saw. Round arbor allows use of any standard blade. Saw bevels at any angle up to 45 deg to a 1½-in. depth. Saw cuts to 2-in. depth at 90 deg. It is powered by universal 5,600-rpm ac/dc motor.—**Stanley Electric Tools, New Britain, Conn.**

"hour after hour . . . without shutdowns"

. . . that's what Byson Harvey, Superintendent of George J. Shaw Hauling Co., Kansas City, Mo., wants and gets with STANOLUBE HD Motor Oil.

Nothing needs to be added to Mr. Harvey's story of his experience with STANOLUBE HD. He writes:

"We are writing to tell you what a completely satisfactory job STANOLUBE HD is doing in our diesel equipment.

"In the ten pieces of dirt-moving equipment that we have in daily use, inspection shows a complete absence of ring sticking, varnish, deposits in ring lands, or corrosion; in fact, STANOLUBE HD does just about as good a job as an oil can do.

"In our work, it's the hour-after-hour operation of the equipment without shutdowns that makes for good results, and we *never* have shut down because of oil failure with STANOLUBE HD."

If your equipment operates under adverse conditions, or if you think engine overhauls are required too frequently, try STANOLUBE HD.

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Motor Oil

The advantages offered you by STANOLUBE HD go hand in hand with the benefits of an automotive engineering service that's unique in the Midwest. The Standard Oil Company has located practically at your doorstep a specially trained and experienced lubrication specialist. This man will give you "on-the-spot" engineering service that's vital to fleet operations. His headquarters are the nearest Standard Oil Company (Indiana) office. You can obtain his assistance by contacting that office or writing: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA) STANDARD

A READY HAND
WITH 500 POUNDS OF PULL

MIGHTY-MIDGET PULLER

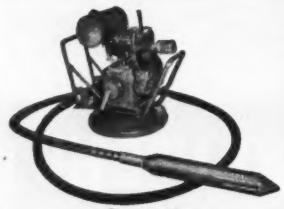
Here's a compact, handy tool that reduces manhandling of heavy materials, helps get machines back on the job quickly. The Coffing Mighty-Midget Puller is ready to go to work—in the shop or out—at a moment's notice. It hooks anywhere...needs just 8½-in. head room, weighs only 6½ lb., works vertically or horizontally. With full 500-lb. capacity, it easily lifts and shifts heavy plates, castings, etc., holds them positively, safely in any position. Pulls engine blocks, installs heavy parts on construction equipment, does many other lifting, stretching, pulling jobs. Factory tested at 50% overload. Two-way handle is either lever or high-speed crank.

Make the Mighty-Midget Puller a standard tool in your shop. See how it saves time and muscle power on scores of jobs. Write for the name of your nearest Coffing dealer and for illustrated Bulletin No. DIMP.

MP5—$21.75
MP10—$31.00

COFFING HOIST COMPANY, Danville, Illinois

Quik-Lift Electric Hoists • Hoist-Alls • Safety-Pull Ratchet Lever Hoists • Spur-Geared Hoists • Differential Chain Hoists • Load Binders • I-Beam Trolleys



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The swiftest, surest dewatering method is also the simplest and most economical. "Complete's" patented fluted tube wellpoints combine compactness with lightness and strength—enable you to handle tougher jobs at lower cost—keep you on firm ground always. Write, wire or phone for estimates—we have the equipment, experience and personnel.

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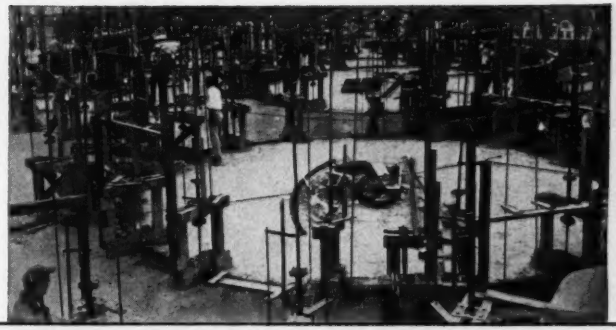
TRANSFER-TYPE SEMI-TRAILER—Trailer in two sections permits hauling large loads while maintaining relatively short body length. It is equipped with a hydraulically powered transfer system and a telescoping hoist. Back half of trailer is unloaded first; then the front half of the trailer is transferred into the empty back half and unloaded. Aluminum bodies are available when desired; lightweight, high-tensile steel is standard. Transfer controls are centrally located in the truck's cab. Overload by-pass valve provides safety factor in instances where obstructions prevent normal transfer.—**Cook Bros. Equipment Co., 1815 N. Broadway, Los Angeles 31, Calif.**

WELDER'S SCALING HAMMER—Features claimed for the Churchward scaling hammer include: Multi-point hammering surface which speeds descaling by loosening scale over a larger surface; hollow-ground head for removing spatter; and slagging pick for accurately pin-pointing removal of slag from weld pockets and corners. The tool can also be used for removing slags from edges of welds.—**Jack Churchward Welding Accessories, North Haven, Conn.**

AUTOMOTIVE MAGNAFLUX UNIT—Model DR-543 Magnaflux unit is particularly recommended for use in automotive overhaul shops. It handles mechanical parts up to 54-in. long. Magnaflux system is designed for non-destructive testing to determine hidden flaws or cracks in crankshafts, pistons, gears, axles, and similar parts. Using Magnaglo compound, and examining under black light, defects show up as a flowing fluorescent line.—**Magnaflux Corp., 5900 Northwest Highway, Chicago 31, Ill.**



Forest of jack rods and temperature steel ready for pouring concrete walls.

No drop-outs, no honeycomb with LEHIGH Air-Entraining Cement

Distribution of aggregate was uniform, the concrete highly plastic and cohesive—characteristics of concrete made with Lehigh Air-Entraining Cement.

Job progress was constant around the clock, with bin walls 130 feet high completed in ten days.

Builders: WILLIAM NEILL CONSTRUCTORS, INC., 30 Vesey St., New York City. Ready Mix Concrete: HENRY K. SMITH, Palmyra, Pa.

Sixteen cacao-bean storage bins, with a capacity of 32,000 tons, equipped to take train-lots and to unload at the rate of 110 tons per hour! This new construction is a striking example of the continuous progress of the world's largest manufacturer of cocoa and chocolate—Hershey Chocolate Corporation, Hershey, Pennsylvania.

These bins of slip-form construction are the largest of their type built for cacao-bean storage . . . and for the plastic, cohesive and uniform concrete, essential in this method of construction, the builders, William Neill Constructors, Inc. used Lehigh Air-Entraining Cement with these results:

Although the air-entrained concrete required less water, placing and consolidating around the reinforcing was much easier . . . excessively wet batches that cause drop-outs and honeycomb were avoided . . . the work was completed ahead of schedule. And the surface of the concrete was so dense and smooth that little finishing was needed.

Our Service Department will be glad to help you with your specific problems.

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threaders, planers, spades, tampers, repair-shop tools and other motor-driven equipment. Carry 'em, wheel 'em, or truck 'em right to the spot and plug in for all the power you need. Equipped with carrying handles or dolly-mounted.

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Lightweight Air-Cooled Models: A.C.—400 to 3,000 watts. D.C.—750 to 5,000 watts. Heavy-duty models to 35,000 watts.

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The catalogs and bulletins reviewed below will keep you posted on latest developments in construction equipment and materials available for your use

WELDING ALLOYS — Folder contains photomicrographs showing how and why Eutectic Low Temperature welding alloys are designed to avoid distortion, stress, warpage, and embrittlement on wide range of metals. Factual information is presented in question and answer form. The principle of Eutectic welding is explained briefly. — **Eutectic Welding Alloys Corp., 40 Worth St., New York 13, N. Y.**

TRACTOR EQUIPMENT — Complete line of attachments for International tractors is described in this Isaacson catalog. Items listed include: hydraulic and cable Trac-Dozers, front and rear Kable control units, Kable Karry-Skrapers, Hydro-Skrapers, Winchoists, Karry-Arches, Karry-Karts, Klearing blades, hydraulic or cable Super-Rooters, and Fas-Tamp rollers. Each item is described in detail, accompanied by photographs showing it in use, and a complete list of specifications covers the various sizes in which each is available.—**Isaacson Iron Works, Rockford, Ill.**

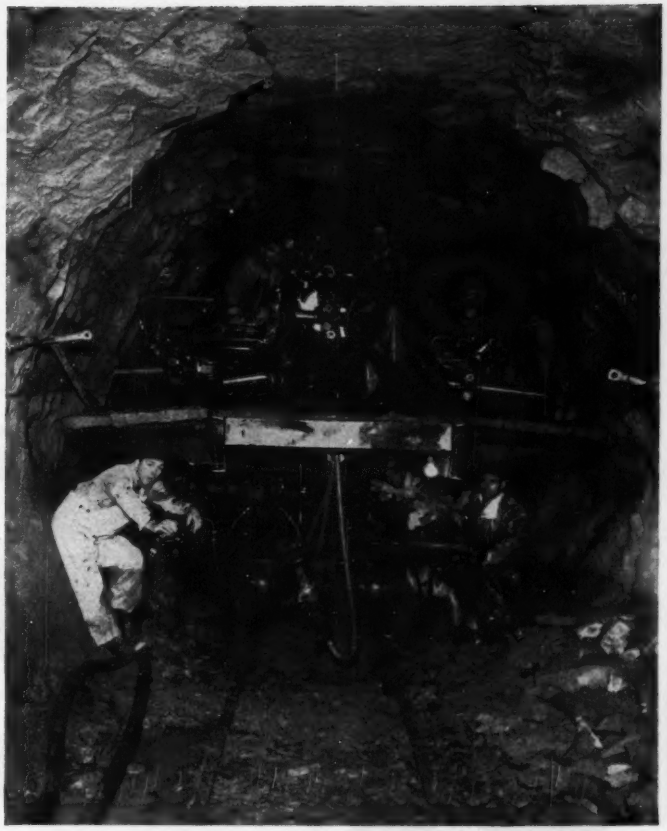
TIMBER DESIGNS—Four catalogs on timber structures have been made available by the Timber Engineering Co. One describes 23 garden apartment designs for military housing, suburban apartments, and low-cost public housing. It features reproductions of prize-winning designs. The second publication, an illustrated 16-p brochure, presents a concise recital of factual accomplishments in timber progress through wood research for national defense and industry. The other two booklets deal with the design of recreation buildings and churches.—**Timber Engineering Co., 1319 Eighteenth St., N. W., Washington 6, D. C.**

PNEUMATIC-TIRED ROLLER — Compaction data on 35- and 50-ton pneumatic-tired Roll-O-Pactors is contained in folder RE-89. Bulletin features description of advantages said to accrue through use of these rollers. Tables contain data from several jobs listing types of rollers used, type of material compacted, number of passes, and density obtained by each roller.—**Wm. Bros Boiler & Mfg. Co., 1057 Tenth Ave., S. E., Minneapolis 14, Minn.**

Neversink Tunnel in Catskills to Aid Thirsty New Yorkers

New Yorkers are looking with confidence to the scenic Catskills for major relief from the threat of water shortages. Completion of three reservoirs by 1955 is expected to pour about 540 million additional gallons each day into the existing Delaware Aqueduct, nearly half of New York's present daily demand. An interesting phase of the new Delaware Water Supply Project is the Neversink Tunnel, being driven through nearly six miles of rock to connect two of the new reservoirs now under construction.

Frazier-Davis Construction Co. was awarded the $15,600,000 contract for this vital tunnel that will allow about 105 million gallons of gushing water each day to flow downgrade from Neversink Reservoir through a mountain into a 25,000-kw hydroelectric plant and then into Rondout Reservoir. Intake and outlet chambers, a water-release tunnel, and other jobs are also a part of the contract.



Two drill jumbos built by Frazier-Davis mount five drifter drills on air-powered booms. These drill about 40 holes, 9½-ft deep, into sandstone and shale, in 1½ hours. A sixth drill is at the back for auxiliary drilling.

In driving the 12½-ft-diameter Neversink Tunnel, Frazier-Davis uses two all-welded drill jumbos of their own design. A V-cut round of 36 to 40 holes is drilled with five drifter drills, using carbide-tipped bits on 1¼-in. rods of Bethlehem Hollow Drill Steel. Six rounds are usually completed every 24 hours in each of two headings for an average daily progress of 50 ft per heading. The tunnel will probably be excavated by the end of 1950, while its completion is scheduled for the end of 1952.

Roy Gunther, Project Manager for Frazier-Davis, comments about the Bethlehem Hollow Drill Steel, which was used exclusively: "We have had exceptional luck in drilling through both shale and hard sandstone. The steel has done a very good job—better than we expected."

All drill steel is returned from the headings to the blacksmith shop every 24 hours. Here it is checked and given any necessary redressing to assure best drilling performance.

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CONCRETE PILES; CAISSONS — Bulletin (8 pp) features suggested standard specification for cast-in-place concrete piles. Performance type specification is prepared to include all recognized cast-in-place concrete piles. Described and illustrated are Western's Button Bottom piles which have been driven to depths in excess of 100 ft; pedestal piles, designed for improving bearing value of soil; composite piles, which are combinations of thin-shell-encased concrete with lower section of wood or concrete-filled pipe; and compressed concrete piles that require no steel. Western claims to have special method of driving these piles which prevents separation of the concrete.—**Western Foundation Corp., 2 Park Ave., New York 16, N. Y.**

SWIVEL-PILERS — Conveyors or wheel-mounted swivel-pilers are described in new catalogs. The conveyor-mounted unit is designed to extend the storage range of fixed or portable conveyors; the wheel mounted, for storing, turning, or aerating granular or small-lump materials. Catalogs describe method of operation of the swivel-pilers and describe their features of construction. Complete specifications and dimensions for each model are listed. —**Stephens-Adamson Mfg. Co., Aurora, Ill.**

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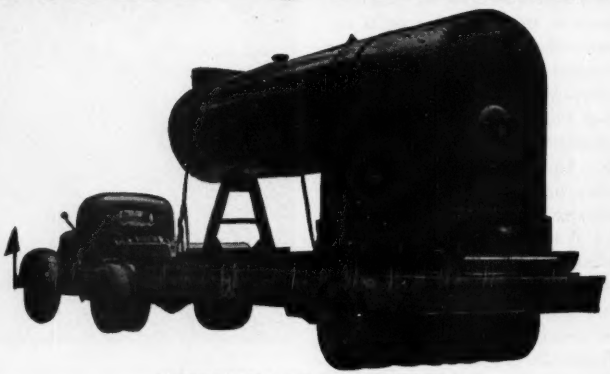

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ZEOLITE SOFTENER—Zeolite softeners for use where relatively small quantities of softened water (less than 100 gpm) are required are described in Publication 4505. Two sizes are listed, each size available in single or double units with greensand, synthetic gel, or resinous-type zeolite material, according to the requirements of the water supplies. Drawings, dimensions, and capacities are shown.— **Cochrane Corp., 17th & Allegheny Ave., Philadelphia 32, Pa.**

CENTRIFUGAL PUMPS—Features and advantages of the Mission centrifugal pumps are listed and described in Catalog CP-749B. Outstanding feature claimed is the use of the Sherzer hydraulic principle of streamlined flow from concentric casings. Engineering and technical data in the catalog is presented by a table of specifications and a series of performance curves listing capacities and heads at various speeds.— **Mission Mfg. Co., P. O. Box 4209, Houston, Tex.**

TANDEM ROLLERS—Features of the KT7 3-to-5-ton roller are illustrated and described in a 4-p folder. This folder shows how the KT7 can be used as a conventional heavy-duty tandem, and how it is easily rigged for towing because of the rubber-tired road wheels carried on a bracket over the drive roll. Component parts described in detail are the engine, transmission, and final drive; the high-speed low-torque clutches; side air intake; hydraulic steering; and self-energizing scarifier. Complete specifications are listed.—**The Buffalo-Springfield Roller Co., Springfield, Ohio.**

PORTABLE HEATING EQUIPMENT—Complete Aeroil catalog (No. 500Y) lists a line of oil-burning, gas-burning, and electrically heated portable equipment. Items listed include the Heet-Master asphalt kettle, cut-back and emulsion power-spraying units, flame guns, lead furnaces, concrete-curing machines, portable flame throwers, salamander and thawing-torch outfits, rivet-heating forges, and a complete line of rakes, hoes, spreaders, tampers, and similar equipment. Each piece of equipment is described and illustrated, and specifications are listed for each size in which each model is available.— **Aeroil Products Co., Inc., Wesley St., South Hackensack, N. J.**

FLEXIBLE HOSE LINES—Information on hose and fittings and instructions on how to assemble them are included in Bulletin 113. Featured in the bulletin is a description of self-sealing and breakaway couplings. Complete dimensions and thread data are provided for each fitting listed in the bulletin.—**Aeroquip Corp., Jackson, Mich.**

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New 2-yard MIXERMOBILE cuts concrete costs at the new state building, Portland, Oregon. (Pouring was done by the Weston Concrete Construction Co.)

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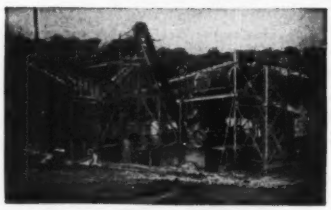

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MICROFILMING SERVICE — Illustrated booklet (12 pp) presents pertinent information on microfilming engineering drawings. This factual publication covers all phases of microfilming including costs, equipment used, storage of film, processing of film and other related subjects.—**Micro-Photo Service Bureau, 4614 Prospect Ave., Cleveland 3, Ohio.**

PORTABLE CONVEYOR — Model 362 portable conveyor for all types of materials is described in this 8-p catalog. Various features claimed for the 362 are described in detail by text and photographs. Schematic diagrams indicate the various ways in which this unit can be used. Also included with the catalog are on-the-job photographs showing typical applications. — **Barber-Greene Co., Aurora, Ill.**

ALUMINUM STRUCTURAL DESIGN—Basic information on design of load-carrying structures in aluminum is presented in complete and up-to-date form in 1950 edition of handbook, "Aluminum Structural Design". Book enables any engineer familiar with mechanics of materials to design an original structure of aluminum, or to convert an existing structural design from some other material to aluminum. Handbook contains 120 pp, 144 illustrations, 39 tables and 3 indexes, including an itemized cross index. It is wire bound and will lie flat when open. Write on company letterhead.—**Reynolds Metals Co., 2500 S. 3rd St., Louisville 1, Ky.**

SAFETY BELTS—Complete line of safety belts is described in this 4-p bulletin. Catalog contains information and facts on belts for all types of service. Bulletin discusses the various materials from which belts are manufactured. Accessory equipment is also discussed.—**Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh 8, Pa.**

HYDRAULIC DOZERS — Straight and angling-blade hydraulic dozers are described in a new Caterpillar broadside. Each of five sizes in each type is illustrated, accompanied by a listing of specifications covering over-all dimensions of blade, over-all dimensions of tractor with mounted dozers, and dimensions of cutting edges. Specifications are also listed for hydraulic system.—**Caterpillar Tractor Co., Peoria 8, Ill.**

UNIVERSAL JOINTS—Information in Catalog C1 includes: How to select universal joints; graphs covering data on tests, efficiency and heat loss; assembly instructions; engineering data covering weights, specifications and dimensions; and complete buying and ordering instructions.—**Curtis Universal Joint Co., Inc., Springfield 7, Mass.**

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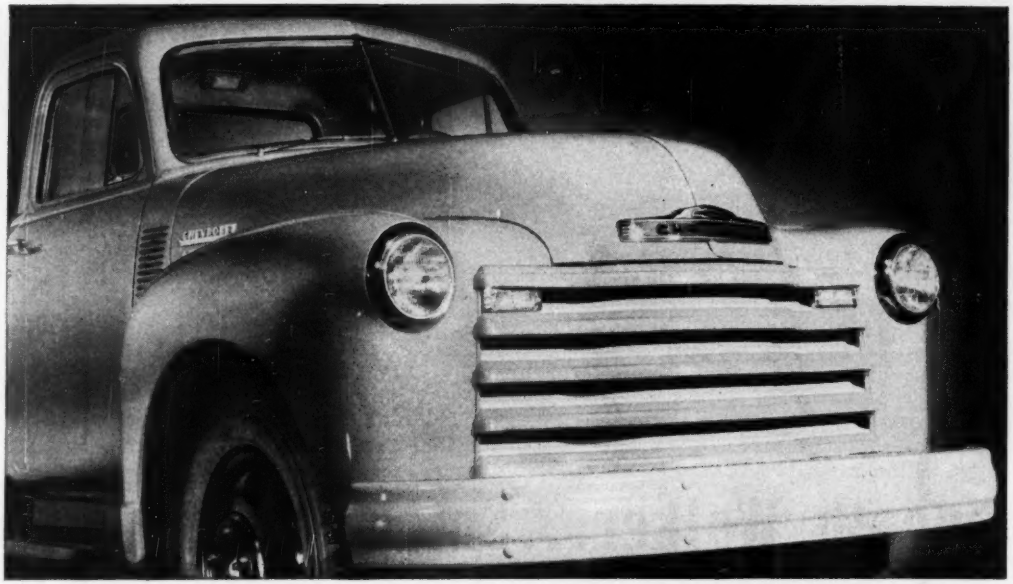

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CHEVROLET

HARD SURFACING—Applications, precautions, and suggestions on proper procedures for hard surfacing manganese steel are contained in a 4-p bulletin. Bulletin features a description of basic factors involved in successful application of hard-surfacing principles as applied to manganese steel.—**Rankin Mfg. Co., 3072 W. Pico Blvd., Los Angeles 6, Calif.**

CONCRETE VIBRATORS; SCREEDS—Gasoline and electric-powered vibrators and screeds are described in Bulletin 507. This bulletin details advantages of vibration in concrete work; recommends specific types of vibrators for specific jobs; and contains a complete listing of available vibrator accessories.—**Stow Mfg. Co., 57 Shear St., Binghamton, N. Y.**

CONVEYOR AND ELEVATOR BELTING—Information bulletin (16 pp) covers all types of conveyors and elevator belting. It contains a discussion of each of the various types of belting and suggestions for their application. Bulletin 3679 is complete with all necessary tables, charts, and formulas for selection of the right type of belt for any application.—**Thermoid Co., Trenton, N. J.**

HEATERS AND COOLERS—Brief description and specifications of a line of gasoline-burning truck cab and cargo heaters and dry-ice cargo refrigeration systems are listed in a 4-p folder. Illustrated with photographs and drawings of various models, it also contains drawings of recommended installations.—**Hunter Mfg. Co., 1550 E. 17th St., Cleveland 14, Ohio.**

CORE DRILL — Bulletin D-28 describes in detail the Joy 22-HD-heavy-duty diamond core drill. Bulletin contains information and complete specifications on the 22-D—described as a 2,000-ft-capacity drill that can be driven by gasoline, electricity or compressed air. Bulletin illustrates various mountings including truck, steel skids and underground column.—**Joy Mfg. Co., 900 Woodland Ave., Michigan City, Ind.**

LOCKNUTS—Various types of locknuts and their principles of operation are listed in 16-p catalog. This catalog discusses the history of locknuts, illustrates early methods devised for locking a nut on a bolt and explains the reasons for the locknut in modern equipment. The final section is devoted to listing the products of several manufacturers. Each locknut is illustrated, accompanied by text describing it, listing its particular principle of operation and listing the manufacturer's name and address.—**Industrial Fasteners Institute, Locknut Section, 3648 Euclid Ave., Cleveland, Ohio.**

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Equipment Distributor Appointments

Four Wheel Drive Auto Co.: FWD Trucks & Equipment Co., Harrisburg is distributor for the entire state of Pennsylvania. Headquarters are at 147 Cameron St.

Koehring Co.: American Machine Co., Spokane, will handle the complete Koehring line of heavy-duty construction equipment along with the products of the three Koehring subsidiaries—C. S. Johnson, Kwik-Mix, and Parsons Companies.

Thew Shovel Co.: Leland Equipment Co. is distributor in all of Oklahoma except Ottowa county. Main office is in Tulsa; with a branch office maintained in Oklahoma City.

Reed Roller Bit Co.: Ensminger Co., 57 Wood St., Wilkes-Barre, Pa., will handle product of the Cleco divison.

Worthington Pump & Machinery Corp.: Hooper Equipment Inc., 1256 S. State St., Syracuse, N. Y., is distributor for the Worthington construction equipment; Lloyds (South Africa) Agricultural, Irrigation, and Industrial Machinery Corp., Ltd., Capetown, will handle Worthington portable air compressors, construction rock drills, and air tools.

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The Celotex Corp.: E. E. Dierking is appointed assistant general sales manager. J. E. Varlie succeeds him as manager of the Chicago sales branch. I. W. "Bob" Hally is named manager of the Philadelphia branch,

(Continued on page 141)

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- Lifting capacity—2,500 lbs.

Optional Equipment: Gin Pole Assembly, "Chicago" Boom, Tip-Over Bucket, Truck Mounting, Interchangeable 10' Extensions.

CONSTRUCTION MACHINERY COMPANIES
WATERLOO, IOWA

FAST ON-THE-SPOT REPAIRS

With This Portable Welder!

This inexpensive "Lincwelder", made by Lincoln Electric Co., Cleveland, O., is easily mounted on running gear or truck for welding service anywhere.

Welding at the breakdown-scene . . . adds up to savings in time and labor with this light but rugged 180 amp. Lincoln Welder, powered by a two-cylinder Wisconsin Heavy-Duty Air-Cooled Engine.

The performance satisfaction of Wisconsin Engine power increases not only the reliability of equipment in all fields, but also increases the confidence of both equipment user and builder. They're sold on such features as self-cleaning, thrust-absorbing Timken tapered roller bearings at both ends of the crankshaft . . . fool-proof air-cooling, from sub-zero to 140°F . . . an easily serviced OUTSIDE rotary type, high tension magneto with impulse coupling, for quickest any-weather starts . . . plus heavy-duty construction, inside and out.

Your investigation is invited! 3 to 30 hp., 4-cycle single-cylinder, 2-cylinder, and V-type 4-cylinder models.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46 WISCONSIN

(Continued from page 138)

succeeding H. E. Mansfield, who has resigned. W. J. Manton is sales representative in the newly created Nebraska territory.

Philip Carey Mfg. Co.: Albert E. Binger, Jr., is named industrial sales manager.

Huber Mfg. Co.: A. T. Green Co., Glenshaw, Pa., will represent Huber in seventeen western Pennsylvania counties and Hancock, Brooke, Ohio, and Marshall counties in West Virginia; Construction Machinery & Supply Co., Inc., 128 S. St. Clair St., will cover the Toledo, Ohio, area.

W. A. Riddell Corp.: Roger E. Newell is district representative in the northeastern states.

George Haiss Mfg. Co., Inc.: Phil Hofer joins his division of the Pettibone Mulliken Corp., as sales representative in New Jersey, covering its line of conveyors and car unloaders.

Caterpillar Tractor Co.: H. J. Hunkele, Jr., is assistant manager of the sales engineering division.

Bendix Radio Communications Div.: William L. Cunningham is district sales manager with headquarters at Chicago.

General Electric Co.: H. M. Wales is appointed district sales manager for two-way radio communications equipment with headquarters in Syracuse. His district includes New England, New York, northeastern Pennsylvania, New Jersey, Maryland, and Virginia.

King & Kringel Machinery Corp.: J. M. East is vice-president and sales manager of this distributor located at 2390 S. Delaware St., Denver, Colo.

Personnel Election

George Haiss Mfg. Co., Inc.: W. E. Madden, vice-president of this division of the Pettibone Mulliken Corp., is elected Chairman of the portable conveyor group by the Conveyor Equipment Manufacturers Assn.

General Electric Co.: Ralph J. Cordiner is president succeeding Charles E. Wilson, new chairman of the defense mobilization board.

Keystone Portland Cement Co.: Thomas Barnes, II, is chairman of the board of directors.

The Euclid Road Machinery Co.: John E. Ehlert is manager of service and parts. He succeeds J. M. Fair-

banks who has been promoted to the post of assistant factory manager.

W. & L. E. Gurley: Charles E. Smart is elected president succeeding C. I. Day, who died in June.

New Sales Outlets

Allis-Chalmers Mfg. Co.: George A. Wampler is manager of the Chicago warehouse sales unit, a new section setup in the Chicago district office to handle sales of small apparatus including motors, controls, Texrope drives and pumps. The new unit is located at 500 E. 27th St.

Ladish Co.: Branch office at 405 Thompson Bldg., Tulsa, Okla., is under the managership of G. E. Mahoney. The St. Louis, Mo., office has moved to the Continental Building.

Allis-Chalmers Mfg. Co.: Ground has been broken for a new tractor branch office in Atlanta, Ga. Completion date is set for Jan. 1951. The building will provide 60,000 sq ft of office and warehouse facilities.

Link-Belt Co.: Factory branch store has been opened at 5020 Centre Ave., Pittsburgh 13, Pa., Otto W. Werner is district manager.

HOUSE CONSTRUCTION COSTS

Just Out

1. A new book that shows how to determine unit costs of house construction—applying to all designs and local price variations. Tells how to determine costs for every building operation; includes data on quantity of material and number of labor hours needed; gives examples of typical unit costs. **By G. Underwood. 302 pages, 63 illus., $4.75**

RADIANT HEATING

2. A guide on designing and installing radiant heating systems. Covers every phase of radiant heating—from how it differs from conventional types of heating, to an explanation of mathematical calculation of heat output, loss, and other factors necessary for efficient design. Describes various kinds of boilers, stokers, fittings, thermostats, etc. **By Richard W. Shoemaker, Consulting Engineer, 306 pages, $3.50**

THE BUSINESS OF HOME BUILDING

3. Explains business methods that make home building more profitable. Gives you "know how" needed to make a profit with minimum risk to your money . . . a practical understanding of economic factors that determine the market for your product . . . the benefit of production knowledge based on the experience of other builders. **By Kenneth B. Johnstone, Carnegie Institute of Technology, and Charles Joren, Wm. Joren and Sons, 289 pages, $4.00**

HANDBOOK OF RIGGING

4. Condensed into this book are the tips, methods and techniques essential to more effective rigging practices in industrial and construction operations. Deals with everyday maintenance operations—with the transportation and handling of heavy machinery—with the erection and demolition of smaller size structures. **By W. E. Rossnagel, Safety Engineer, Consolidated Edison Co., 321 pages, over 300 illus., $4.75**

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Position CM-1-51

This offer applies to U. S. only.

The Tenth of a Series in the interest of more efficient use of steel . . . a vital American resource

NOW!

ORDER BY NUMBER

...THE NEW, EASY WAY TO SPECIFY

LACLEDE *Multi-Rib* Reinforcing Bars

ROUND BARS in all sizes . . . to meet latest ASTM A305 Specifications . . . conveniently marked to make your specification job easier. And, of course, improved Laclede deformations mean uniform reinforcement strength, maximum anchorage — plus a more efficient use of steel by eliminating hooks and shortening embedment lengths.

TABLE OF ASTM A305 SPECIFICATIONS

	NOMINAL DIMENSIONS ROUND SECTIONS			REQUIREMENTS OF DEFORMATIONS		
Bar-No.*	Unit Wt. Lbs./Ft.	Diameter-Inches Decimal	Cross Sectional Area Sq. Inches	Perimeter	Max. Avg. Spacing In.	Min. Height Inches	Max. Gap. Inches*
2†	0.167	0.250	0.05	0.785	.. ..	.. .	.. ..
3	0.376	0.375	0.11	1.178	0.262	0.015	0.143
4	0.668	0.500	0.20	1.571	0.350	0.020	0.191
5	1.043	0.625	0.31	1.963	0.437	0.028	0.239
6	1.502	0.750	0.44	2.356	0.526	0.038	0.286
7	2.044	0.875	0.60	2.749	0.612	0.044	0.334
8	2.670	1.000	0.79	3.142	0.700	0.050	0.383
9‡	3.400	1.128	1.00	3.544	0.790	0.056	0.431
10‡	4.303	1.270	1.27	3.990	0.889	0.064	0.487
11‡	5.313	1.410	1.56	4.430	0.987	0.071	0.540

*Bar numbers are based on the number of ⅛ inches in the nominal diameter of the section.
†Bar number 2 in plain rounds only.
‡Bars numbered 9-10-11 correspond to former 1" sq., 1⅛" sq., and 1¼" sq. sizes, and are equivalent to those former standard bar sizes in weights and nominal cross-sectional areas.
°Chord of 12 ½% of Nom. Perimeter.

LACLEDE
Producers of Construction Steel

"For the Best in Reinforcing Steel—Specify Laclede"

LACLEDE STEEL COMPANY
St. Louis, Mo.

Masonite Corp.: George M. Syversen is named director of western sales in charge of a new plant in Ukiah, Calif. This plant will serve California, Oregon, Washington, Idaho, Utah, Nevada, Arizona, and New Mexico.

New Plants and Offices

Flexible Tubing Corp.: Has moved into its new 13,000 sq ft plant in Guilford, Conn.

Great Lakes Carbon Corp.: Two new Permalite plants—one on Harry's Road, Dallas, Tex.; the other, in Hopewell, Va.

The Electric Storage Battery Co.: Plans have been completed for renovation of the Exide plant in Fairfield, Conn.

Dallett Co.: Purchased in 1947 by the Reed Roller Bit Co., this outfit has been moved to the Cleco Div., plant in Houston, Tex.

Gunnison Homes, Inc.: Expansion program of plant at New Albany, Ind., will raise production capacity by 100,000 sq ft.

Ownership Changes

United States Steel Corp.: Merger of Pittsburgh Limestone Corp. and Michigan Limestone & Chemical Co. into a single operating subsidiary is announced. The merged company will retain the name of Michigan Limestone & Chemical Co.

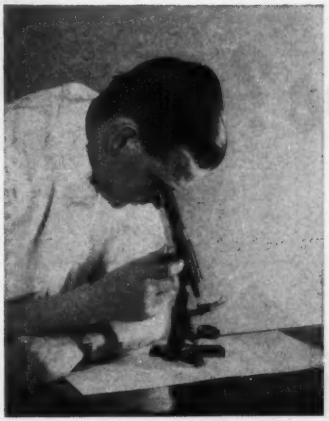
R-S Products Corp.: Purchase of this company is announced by S. Morgan Smith Co. of York, Pa. Present management of the company will be retained along with the present five-man board of directors.

Borg-Warner Corp.: Separation of the Ingersoll Steel Division into two distinct units is announced. One will continue to be known under the present name; the other will bear the name of the Ingersoll Products Division.

Lima-Hamilton Corp.: Assets and business of this company have been acquired by the Baldwin Locomotive Works. Activities of the combined companies will be carried on under the name of Baldwin-Lima-Hamilton Corp.

Wintroath Pumps, Inc.: This company has been acquired by the Worthington Pump & Machinery Corp. Wintroath will operate as a wholly owned subsidiary, continuing under its present management.

...All Masonry Needs Protection



38 YEARS OF TRIALS, TESTS AND CHANGES TO REACH PERFECTION.

Today, we supply to the construction industry products of such merit and efficiency as have become generally recognized as being ideal for the function for which they were originally designed.

Euclid Senior High School, Euclid, Ohio. Architect — Harry A. Fulton, Cleveland, Ohio.

Associate Architects — Ben Krimsky and R. B. Dela Motte, Cleveland, Ohio.

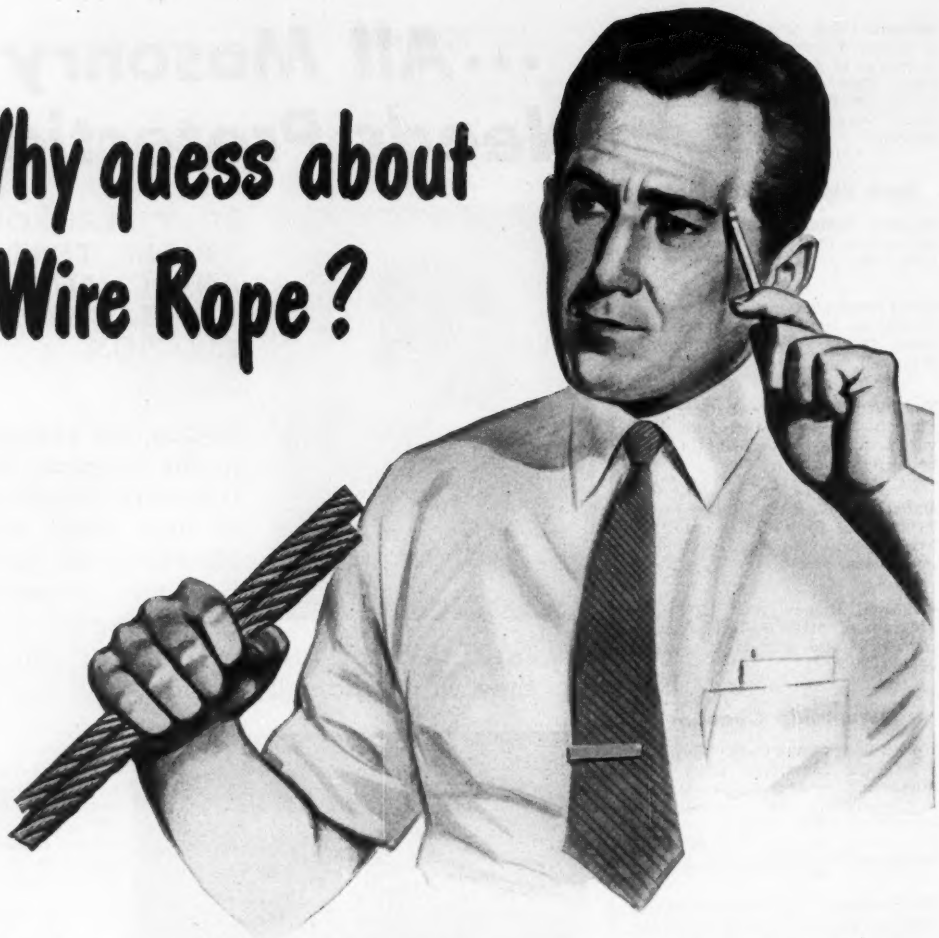
Mercy Hospital, Miami, Florida. Commencing of THORO-SEAL applications. Architect — Steward and Skinner, Miami, Florida. Contractor—J. Y. Gooch Co., Miami, Florida.

Get our 20-page brochure, pictorially describing, in detail, "How To Do It." It's yours for the asking. — No. 140.

Standard Dry Wall Products

BOX X. NEW EAGLE, PENNA.

Why guess about Wire Rope?



Let's call this a picture of a man who used to guess about his wire rope. He often guessed wrong. Was never really sure which brand was costing him the most—and the least.

Now he's keeping records. A Bethlehem man showed him the value of knowing what he was actually getting for his rope dollar. Showed him that the true cost of wire rope is the cost per unit of work—per ton-mile, cubic yard of rock moved, etc. Showed him how easily records could help him determine this cost per unit of work.

It's something Bethlehem strongly recommends, for purchase price alone is a false yardstick of rope value and rope economy. Frankly, we welcome any steps that will help users compare brands of rope, for the Bethlehem product is built to give outstanding service at very low cost. This is a fact you can prove to your own satisfaction by keeping a few simple records.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

LET YOUR RECORDS TELL YOU!

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WHERE TO BUY

STOP that WATER

WITH FORMULA NO. 640. A clear liquid which penetrates 1" or more into concrete, brick, stucco, etc., seals—holds 1250 lbs. per sq. ft. hydrostatic pressure. Cuts costs: Applies quickly—no mixing—no cleanup—no furring—no membranes. Write for technical data—free sample.

Haynes Products Co., Omaha, Neb.

SEARCHLIGHT SECTION

(Classified Advertising)

EMPLOYMENT: BUSINESS: "OPPORTUNITIES" :EQUIPMENT :USED OR RESALE

UNDISPLAYED —RATES— DISPLAYED

$1.30 per line, minimum 4 lines. To figure advance payment count 5 average words as a line.

Individual Employment Wanted undisplayed advertising rate is one-half of above rate payable in advance.

Box Numbers—Care of publication New York, Chicago or San Francisco offices count as one line.

Discount of 10% if full payment is made in advance for 6 consecutive insertions.

Individual Spaces with border rules for prominent display of advertisement.

The advertising rate is $11.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on one column, 3 columns—30 inches—to a page.

New Advertisements received by January 24th will appear in the February Issue C.M.

WANTED

Top Flight Executive with Construction Engineering background for successful Ready Mixed Concrete and Block Plant. Must be capable in responsible position in Management, Personnel, Production, Product Design, Plant Maintenance, and analyze and interpret Cost information, and determine suitable action. Give full details and references. Write J. Francis Smith, P. O. Box 1071, Waterbury, Connecticut.

2—UD 18 power units & Gen.
1—UD 14 power units clutch & pulley
1—D 11000 power units with clutch
1—Whitman Loc. gas 24 gauge with track & switches
1—Am. 10 Ton all steel stiff leg derrick
1—½ yd. Unit shovel front

CHAS. H. HOGAN
4536 Colfax Ave. S, Minn. 9, Minn.

PILING

Need
STEEL SHEET PILING?
RENT IT . . . FASTER from FOSTER
LARGEST STOCKS IN U. S.
All Lengths • All Sections
Also Corrugated Steel Sheet Piling
Foster's rental rates give you a low fixed expense for competitive bidding purposes.
Pile Hammers & Extractors For Rental
Rails•Truck Accessories•Wire Rope•Pipe
L.B. FOSTER CO.
PITTSBURGH 30, PA. CHICAGO 4, ILL.
HOUSTON 2, TEX. NEW YORK 7, N.Y.

"SEARCHLIGHT" IS Opportunity Advertising

—to help you get what you want.

—to help you sell what you no longer need.

Take Advantage Of It
For Every Business Want
"Think SEARCHLIGHT FIRST"

BRAND NEW FACTORY Surplus SALE!

PORTABLE MULTI-USE POWER SAW

SAVE $300
WAS $499.00
NOW $199.00
FOB MINNEAPOLIS, MINNESOTA

CUTS WOOD
CUTS BRICK
CUTS CONCRETE
CUTS METAL

America's greatest saw bargain! Cuts lumber to 4" thick. Briggs & Stratton 3½ H.P. gas engine. Saw cuts flue lining, transite pipes, steel sheets, copper & aluminum, etc. Does work of $1,000 worth of saw equipment. Sharpens tools. Famous make, brand new, original crates. Limited supply. Send for literature. Dept. CM-1

AT 1201
ENNIS SUPPLY CO.
134 1st St. N., Minneapolis 1, Minn., U.S.A.

SPECIAL BUY

Over 57,000 4.00x8 wheelbarrow wheels

2-piece bolted construction of 12-gauge pressed aluminum. Your choice of ¾-inch, ⅝-inch or ½-inch axle size.

Order 50 or more without rubber at $1.35 each.

With 2 ply pneumatic tires $6.69

THE NEILSON WHEEL CO.
1612 N. 12th St. Milwaukee, Wis.

GOING INTO THE ARMY
Must Sell Following Equipment
1947 Bucyrus-Erie 10B Shovel W/Shovel Front & Trench-Hoe Attachments
1949 Allis-Chalmers HD5B—Bulldozer
1944 Fruehauf 10-Ton Low-Bed Trailer
SACKS & KAMINSKY
MOUNTAINDALE, N. Y.
Telephone—Woodridge 480

Trouble-Free PERFORMANCE

"It's the only machine we've had for any length of time that has had no major repairs." That's what William Wylie, equipment foreman, says about the MICHIGAN ½ yd. Crawler Excavator owned by A. G. Woods Company, Windsor, Connecticut. Yes . . . it's quite a record for an excavator that has been *"worked hard," 10 to 14 hours a day for a year and a half.*

At Woody Crest Housing Development in West Hartford, Connecticut, the MICHIGAN digs service, sewer, water and drainage ditches . . . excavates for septic tanks and basements . . . loads trucks. Digging 450 feet of trench and laying the eight inch pipe is an average day's work.

Service records like this are typical for MICHIGAN Excavator-Cranes. Why settle for less? When *you* need an excavator-crane . . . investigate MICHIGAN . . . you'll agree it's *your best buy!* Write, wire or phone for complete details.

MICHIGAN POWER SHOVEL COMPANY

495 Second Street, Benton Harbor, Michigan, U. S. A.

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■

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POZZOLITH CONCRETE

BETTER TODAY . . . BETTER TOMORROW

Boise, Idaho $1,500,000 sewage disposal plant.
Engr.—Alvord, Burdick & Howson, Chicago, Illinois;
Contr. — C. B. Lauch Construction Co., Boise, Idaho.

OTHER MASTER BUILDERS PRODUCTS IN WHICH CEMENT DISPERSION IS EMPLOYED

EMBECO . . .
For non-shrink grouting and reintegration.

MASTERPLATE . .
For "iron-clad" concrete—industry's toughest floor. Noncolored and 11 colors.

MASTERTEX . . .
Cement-base paint of low permeability for protecting and decorating exterior and interior surfaces of concrete and masonry.

OMICRON MORTARPROOFING . .
For tight brick walls. Provides good workability with 15-20% less water, correct water retentivity. Contains stearate.

Sewage disposal and filtration plant *construction requirements* of—
easy placeability for thin wall sections
low shrinkage and
no segregation
are *standard performance* with Pozzolith Concrete.

Inspection reports from many plants — in operation up to seventeen years — show that Pozzolith also provides the important *service requirements of* —
exceptional resistance to freezing and thawing
resistance to corrosion and
low permeability.

Pozzolith produces these immediate and long term benefits because —

(1) it disperses cement, greatly increasing cement efficiency,
(2) it reduces water, providing low permeability,
(3) it entrains the optimum amount of air, giving great durability,
(4) it conforms with the water cement ratio law, assuring design strengths.

These are also the reasons why Pozzolith produces concrete of any given quality *at lower cost than by any other means.*

Full information and Pozzolith booklet on request.

The MASTER BUILDERS Co.

CLEVELAND 3, OHIO — TORONTO, ONTARIO

HERE'S WHAT WE PUT *INTO* A ROCK DRILL ...SO YOU CAN GET MORE *OUT* OF IT!

Combination Backhead for blast rod, air tube or water tube operation greatly reduces cost of change-over parts. Air-operated automatic water valve is optional on same backhead.

Jet Valve is instantaneous, positive-acting, end-seating. Thrown by a jet of air, it provides precise timing. Increased piston hammer velocity results in high drilling speed, low air consumption, strong rotation and easy holding.

Integral Cylinder. All hammer bores are ground in line at one operation, allowing piston hammer to run in true alignment. Replaceable bronze cylinder bushing maintains the front cushion.

Resilient Retainer. Yoke-type, held in replaceable hardened steel bushings and spring-cushioned to dampen vibrations when pulling drill rods. Easily opened and closed, can't wear the chuck housing, and has positive lock-on nuts.

Four-Pawl Rotation. Four reversible pawls give maximum service at four rotation speeds — extra fast, fast, slow, extra slow.

Independent Blow Control changes from drill to blow with ease. Full line pressure available for emergency blowing. Large diameter air tube assures strong, constant blow. Side outlet exhaust is possible with optional blow valve.

Three-Piece Chuck. Chuck, sleeve and nut. Replaceable bronze chuck nut held in a steel sleeve checks piston flute wear.

Worthington BLUE BRUTES

Have Everything You Need For Hard, Fast, Money-Saving Drilling

With every detail designed to make air do more work, Blue Brute Rock Drills combine the ruggedest construction with the easy handling that goes over big with operators. The WS-55, illustrated, is right for average jobs. For lighter work, use the WS-45 — for heavy duty, the WS-30.

3 More Reasons Why There's More Worth In A Blue Brute!

WB-34 Paving Breaker
Hardest-hitting, easiest handling breaker in the 35-lb. class. Ideal where the operator has to lift the tool frequently in guiding its work.

W-14 Clay Digger
Developed in the field by men with practical experience in clay, and thoroughly proved by long, rigorous job-testing.

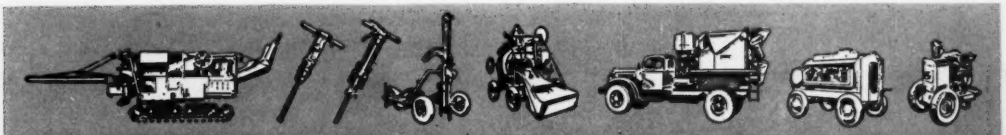
W-8 Backfill Tamper
Medium weight, with simple horseshoe valve and ample oil reservoir. A good "walker" that does a finished backfill job, ready for immediate paving.

Worthington Pump and Machinery Corporation
Construction Equipment Department
Harrison, New Jersey

Distributors In All Principal Cities

WORTHINGTON

Immediate deliveries from your nearby Worthington Distributor
See him, or write us direct

BUY WORTHINGTON BLUE BRUTES

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